

**VOLUNTARY CORRECTIVE ACTION WORK PLAN  
RCRA FACILITY INVESTIGATION  
NAVAL SUPPORT ACTIVITY MEMPHIS**

**SWMU 18  
REMOVAL OF N-112 UNDERGROUND WASTE TANK**

Revision: 2

38054.000  
19.49.00.0009

1D-00641

CTO-094  
Contract No. N62467-89-D-0318

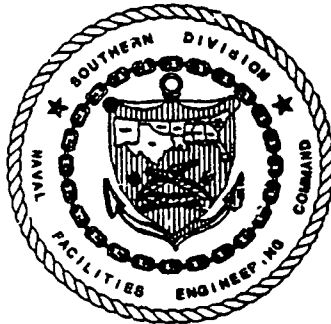
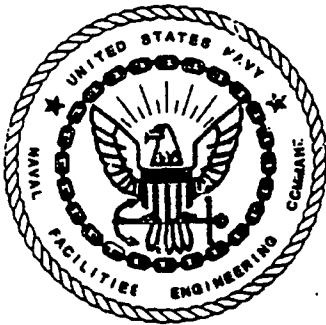
Prepared for:

Department of the Navy  
Southern Division  
Naval Facilities Engineering Command  
North Charleston, South Carolina

Prepared by:

EnSafe/Allen & Hoshall  
5720 Summer Trees Drive, Suite 8  
Memphis, Tennessee 38134  
(901) 383-9115

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## 1.0 INTRODUCTION

As part of the U.S. Navy's Installation Restoration Program, the following Resource Conservation and Recovery Act (RCRA) Voluntary Corrective Action Work Plan has been prepared by EnSafe/Allen & Hoshall (E/A&H) for the removal of Solid Waste Management Unit (SWMU) 18, the N-112 Underground Waste Tank (UWT) from the Building N-112 (Ground Support Equipment Shop) area at Naval Support Activity (NSA) Memphis, Millington, Tennessee (Figure 1). The primary references for this work plan are the *Comprehensive RCRA Facility Investigation (RFI) Work Plan, Naval Air Station (NAS) Memphis, Millington, Tennessee* (E/A&H, 1994), and the *RCRA Facility Assessment, NAS Memphis, Millington, Tennessee* (ERC/EDGE, 1990) (Appendix A).

## 2.0 ENVIRONMENTAL SETTING

SWMU 18 is approximately 150 feet south of Funafuti Street on the NSA Memphis Northside in the Building N-112 complex (Figure 2), which is used for vehicle and ground support equipment maintenance. SWMU 44 (N-102 Hazardous Waste Accumulation Point) and SWMU 26 (N-102 Battery Acid Neutralization Unit), also in the Building N-112 complex, are both part of the RFI. SWMU 26 was investigated in the Spring of 1995, with the results of the investigation presented in the *Draft Assembly C Confirmation Sampling Investigation (CSI) Report* (E/A&H, 1995). SWMU 44, which was included in the Assembly D CSI, was investigated in the Fall of 1995. The results of this investigation are presented in the *Draft Assembly D Confirmation Sampling Investigation Report* (E/A&H, 1996). Both SWMUs were recommended for no further action.

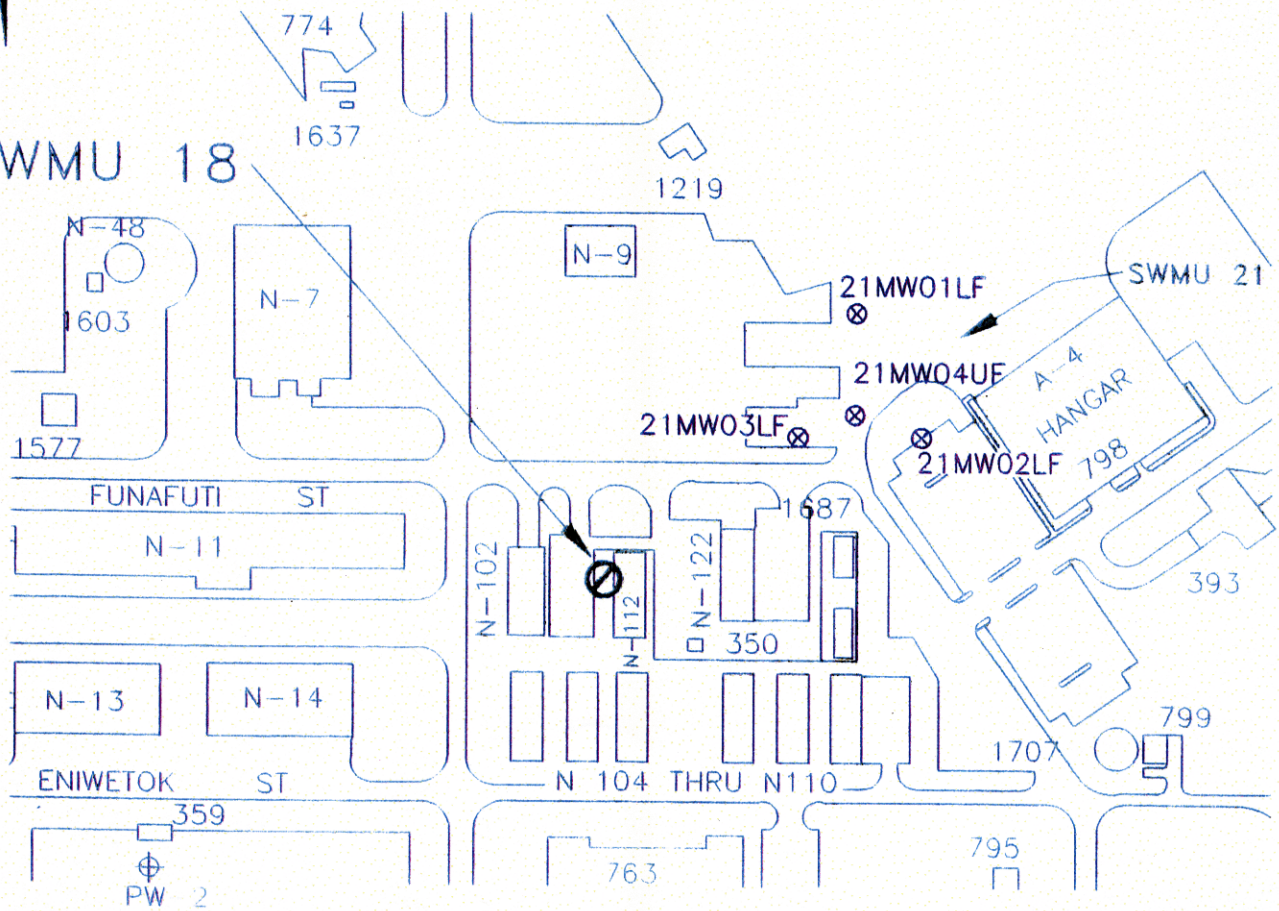
### 2.1 Topography and Drainage

The site is on an elevated paved area between Buildings N-102 and N-112 with a retaining wall facing Funafuti Street to the north. The street is approximately 3 feet below the paved area. The site drains to the southwest into the SWMU 4 storm sewer via a drainage ditch, which at





SWMU 18



LEGEND

PW-2 ⊕ PRODUCTION WELL  
⊗ MONITORING WELL

200 0 200  
SCALE FEET



RFI WORK PLAN  
NSA MEMPHIS  
MILLINGTON, TN

FIGURE 1  
VICINITY MAP  
BUILDING N-112  
UNDERGROUND WASTE TANK  
SWMU 18

DWG DATE: 05/01/96 DWG NAME: 94VM18

00641 CBIY

FUNAFUTI

STREET



SWMU 26

SWMU 18

SWMU 44

N-102

N-112

N-122

350

50 0 50  
SCALE FEET

LEGEND



SWMUs



GRASS

GRAVEL



RFI WORK PLAN  
NSA MEMPHIS  
MILLINGTON, TN

FIGURE 2  
SITE MAP  
BUILDING N-112  
UNDERGROUND WASTE TANK  
SWMU 18

DWG DATE: 06/04/96 DWG NAME: 94SM18

its closest point is approximately 1,000 feet south of SWMU 18. SWMU 4 ultimately empties into the North Fork Creek.

## **2.2 Hydrogeologic Information**

Regional and local hydrogeology are described in Sections 2.11 and 2.12 of the *Comprehensive RFI Work Plan*.

### **Stratigraphy**

Site-specific stratigraphic data are not available for SWMU 18, however, soil borings for monitoring wells installed at SWMU 21, approximately 350 feet to the northeast are available. The proposed activities at SWMU 18 will take place within the loess, however, the findings of this investigation may impact the underlying strata.

Information obtained from monitoring well installation at SWMU 21 indicates that the loess in this area is approximately 30 feet thick and is comprised of a clayey silt intermixed with medium to fine grained sand. The fluvial deposits, extending to an approximate depth of 94 feet bls, consist of a fine to medium grained sand intermixed with sand and gravel. The recorded depth to water in the upper fluvial deposits is approximately 35 feet below land surface (bls). The borings for the monitoring wells installed at SWMU 21 were advanced to approximately 95 feet bls to verify the depth to the Cockfield formation in this area. The Cockfield is composed of clay, intermixed with fine sand.

### **Shallow Groundwater**

No groundwater wells exist at SWMU 18. However, monitoring wells at SWMU 3, approximately 1,500 feet south, indicate groundwater is typically first encountered in the loess at about 15 feet bls. Groundwater level data previously obtained during the RFI indicate that groundwater flow in the loess is very localized, following surface and subsurface topography.



Water level data obtained from SWMU 21 (April 8, 1996), approximately 350 feet northeast, indicate static water level in the fluvial deposits at 35 feet bls. Based on piezometric surface maps for SWMUs 3 and 21, groundwater is presumed to flow southwesterly in the fluvial deposits.

### **2.3 Climatological Data**

Regional climatological data are provided in Section 2.8 of the *Comprehensive RFI Work Plan*.

## **3.0 SOURCE CHARACTERIZATION**

UWT N-112, a 550-gallon steel tank, reportedly receives waste engine oil and hydraulic fluid generated during ground support equipment maintenance at Building N-112. Neither the installation date nor the period of use is known.

## **4.0 CHARACTERIZATION OF HAZARDOUS CONSTITUENT RELEASES**

### **4.1 Previous Investigations**

No previous investigations have been conducted at SWMU 18. However, SWMU 44 (N-102 Hazardous Waste Accumulation Point) and SWMU 26 (N-102 Battery Acid Neutralization Unit), also in the Building N-112 complex, have been investigated as part of the NSA Memphis RFI. Based on the results of sample analysis, no further action was recommended for both sites.

### **4.2 Tank Removal**

The tank will be removed by a Navy Underground Storage Tank (UST) program contractor according to the specifications shown in Sections 02050, 02082 and 01560 of *Storage Tanks and Solid Waste Management Units Removal, NSA Memphis* (Specifications 06-96-0720) (included as Appendix B) and the April 16, 1996 revisions to Specification 06-96-0720. The specifications prepared by the Southern Division Naval Facilities Engineering Command are summarized as follows:

- Before tank removal activities begin, E/A&H personnel will sample the tank contents. If multiple phases (i.e., sludge, oil, water) are present, each phase will be sampled. The samples will be analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and polychlorinated biphenyls (PCBs) for to determine what types of wastes (e.g., used oil, solvents, PCB-contaminated oil) might have been disposed of in the tank and potentially released to the environment. Toxicity Characteristic Leachate Procedure (TCLP) benzene, TCLP metals, pH, and flash point will be performed to determine disposal options. Samples will be submitted to a local laboratory for analysis within a normal turn around time (10 days). This will allow receipt of analytical results before tank removal.
- After the tank is sampled, all potential fill ports will be secured in accordance with Section 02082, part 3.20 of Specifications (06-96-0720) (Appendix B) to prevent the introduction of additional wastes.
- Any material remaining in the tank will be removed by the tank removal contractor and containerized in U.S. Department of Transportation (DOT)-approved 55-gallon drums, properly labeled based on the characterization, and transported to Building N-1694 for storage pending disposal through the Navy's Defense Reutilization and Marketing Office (DRMO). The contractor shall provide a container storage log to the DRMO prior to transport of any material to Building N-1694 in accordance with the revisions to Section 01560, part 3.5.1 of Specifications (06-96-0720) (Appendix B).
- All overlying asphalt will be segregated and stockpiled for disposal by the removal contractor.

- Safety measures such as barricades and flagging will be the responsibility of the removal contractor. Detailed information will be provided in the contractor's health and safety plan to be furnished in accordance with Part 3.2 of Section 02082 of Specifications (06-96-0720).
  
- The tank will be washed out using water and detergent and rinsed to remove any dirt, sludge, or waste oil remaining in the tank (see Section 02082, part 3.21.3 [Appendix B]). The tank will then be removed as described in Subsection 3.21.4 of Section 02082 of Specifications (06-96-0720) (Appendix B). After removal, the tank will be disposed by the contractor in accordance with Section 01560, part 3.2 of Specifications (06-96-0720) (Appendix B). All wash water generated during this process will be containerized, sampled, and analyzed for oil and grease as requested by the City of Millington contracted engineers, Fisher & Arnold, Inc. The number and types of analyses performed on the wash water could be modified based on the results of the tank content tests. The results of these analyses will be submitted (within 24 hours of receipt) to the NSA Memphis Public Works Office and Fisher & Arnold, Inc. before discharging the wash water to an onsite oil/water separator connected to the sanitary sewer system served by the City of Millington publically owned treatment works (POTW). Water that contains contaminants exceeding the locally acceptable concentrations shall be disposed of by the Government in accordance with federal, state, and local regulations. The containerized water will be labeled by the removal contractor showing the type of contaminants and will then be delivered, with a container storage log, by the removal contractor to Building 1694, Part B permitted Hazardous Waste Storage Facility at NSA Memphis. E/A&H personnel will collect samples of any wash water generated.
  
- Any visibly contaminated soil, or soil exhibiting organic vapor reading above background levels, will be excavated, segregated and sampled for waste characterization and disposal.

The material shall be containerized in lockable, lined, roll-off containers to be provided by the contractor in accordance with the revisions to Section 01560, part 3.5.1 of Specifications (06-96-0720) (Appendix B). One composite sample collected from this material will be submitted for an F001-F005 solvent scan, PCBs, TCLP-total petroleum hydrocarbons (TPH), and a full TCLP analysis less pesticides. Composite samples will consist of a homogenization of three equal volumes (one from each end and one from the middle) of soil collected from each roll-off box two feet deep into the soil. The results of these analyses will be used to determine the type of material released, if any, to determine disposal options (i.e., whether the material is a listed or characteristic hazardous waste), and to aid in any future investigations of the area, if needed.

- All excavated material that is not visibly contaminated or does not exhibit organic vapor readings above background will be placed in lockable, lined roll-off containers provided by the contractor. A composite sample will be collected from the roll-offs, using a hand auger (as described in Section 4 of the *Comprehensive RFI Work Plan*), and will be analyzed for VOCs, SVOCs, Appendix IX metals, PCBs, TCLP- TPH, and a full TCLP analysis less pesticides. Samples for VOC analysis will not be homogenized. The results of these analyses will be used to characterize the material for disposal. If necessary, additional analyses will be performed to meet Browning-Ferris, Inc. (BFI) landfill requirements. The number of composite samples collected will be determined by the amount of material excavated and/or the number of roll-off boxes used.
- Any material characterized as a Special Waste under the TDEC Department of Solid Waste Management rule 1200-1-7-.01(4) shall be disposed of by the contractor in accordance with the revisions to Section 01560, part 3.5.1 of Specifications (06-96-0720) (Appendix B). The contractor shall also submit all special waste permits (to include all associated filing fees), to the appropriate agencies/facilities.

- If laboratory testing indicates that soil excavated from SWMU 18 is unsuitable for disposal at the BFI landfill, or is shown to be hazardous waste, the removal contractor will transfer the soil into lockable, bulk roll-off containers provided by the Government (the Government will require at least four weeks after notification before roll-off can be provided onsite). Bulk containers will be labeled in accordance with regulation as to content, per Section 01560, part 3.5.1 of Specifications (06-96-0720). All containers to be used for hazardous waste disposal will be DOT-approved. The Government, through the Defense Reutilization and Marketing Office (DRMO), will disposed of all excavated soil unsuitable for disposal at the BFI landfill or shown to be hazardous waste. A container storage log will be completed by the removal contractor prior to transfer to the Government. Hazardous wastes will be labeled by the removal contractor showing type of contaminants and will then be delivered by the removal contractor to Building N-1694, Part B Permitted Hazardous Waste Storage Facility at NSA Memphis per Section 02050, part 3.2 of Specifications (06-96-0720).
- E/A&H will submit a Voluntary Corrective Action Report (similar to the Closure Report described in Subsection 3.23 of Section 02082) to the Navy within two weeks of receiving validated confirmation sample data.
- A Closure Report is to be submitted by the removal contractor, as specified in Subsection 3.23 of Section 02082 of Specifications (06-96-0720) (Appendix B). This report must meet the requirements set by the TDEC Division of Underground Storage Tanks, Underground Storage Tank Program (Chapter 1200-1-15). This report shall be submitted to the Base Realignment and Closure (BRAC) Cleanup Team via the NSA Memphis Public Works Office.



#### **4.3 Confirmation Sampling**

Two confirmation (grab) soil samples will be collected from each end of the bottom of the tank pit to assess the need for further investigation. Soil from the tank pit will be analyzed for VOCs (to include BTEX), SVOCs, Appendix IX metals, TPH (by EPA Method 418.1) and PCBs due to the type of wastes potentially stored in the UWT. Confirmation samples will be collected by the E/A&H personnel as specified in the revisions to Part 3.15.3 of Section 02082 of Specifications (06-96-0720) (Appendix B).

Confirmation samples will be collected from the pit floor 1 foot into the native soil using a backhoe bucket. E/A&H personnel will not enter the pit to collect samples. Grab soil samples will be collected from the center of the bucket to avoid sample contamination from the bucket wall. The samples will be collected with a plastic scoop in accordance with the procedures described in Section 4.4.3 of the *Comprehensive RFI Work Plan*. In the event that visibly contaminated soil, or soil exhibiting elevated organic vapor readings, is present, biased samples of that material will be collected for release characterization purposes. A normal 28-day turnaround will be requested for all confirmation analytical results and a 14-day turnaround will be requested for disposal analytical results.

#### **4.4 Backfilling**

The tank pit will be backfilled using clean pea-gravel immediately after the tank is removed. The BRAC Cleanup Team will decide whether to investigate the tank pit further after reviewing the data. Backfill material will meet the specifications referenced in Section 02220 of Specifications 06-96-0720 (Appendix B).

#### **4.5 Analytical Requirements**

Sample analysis for this field investigation/tank removal will be to provide confirmation/release characterization data, and to determine disposal options for any waste material generated.

Samples submitted to determine the condition of the tank pit (confirmation/release characterization) will be analyzed for VOCs (to include BTEX constituents), SVOCs, Appendix IX metals, TPH (by EPA Method 418.1) and PCBs. Analysis for disposal samples collected will include an F001-F005 solvent scan, PCBs, TCLP-TPH, and a full TCLP analysis (less pesticides). Samples collected from water generated during decontamination activities (equipment and/or tank) will be submitted for oil and grease analysis (per Fisher & Arnold, City of Millington contracted engineers). Analytical requirements for the samples scheduled to be collected at SWMU 18 are summarized in Table 1.

Field measurements at SWMU 18 will be taken in accordance with Section 4.10.1 of the *Comprehensive RFI Work Plan*. Field measurements will include organic vapor detection for soil samples.

**Table 1**  
**Sample Summary and Analytical Requirements**

Sample Type	Matrix	No.	Composite/Grab	Analytical Parameters	Turnaround Time
Waste Characterization (Tank Contents)	Liquid (if present)	1	Grab	VOCs	10 days
	Sludge (if present)			SVOCs	
	Oil (if present)			PCBs	
	Waste (if present)			TCLP Benzene TCLP Metals pH Flash Point	
Release Characterization	Soil (if necessary)	1	Grab	VOCs SVOCs Appendix IX Metals PCBs	28 days
Confirmation	Soil (Tank Pit)	2	Grab	VOCs SVOCs Appendix IX Metals PCBs	28 days

**Table 1**  
**Sample Summary and Analytical Requirements**

Sample Type	Matrix	No.	Composite/Grab	Analytical Parameters	Turnaround Time
Soil Disposal	Soil (Excavated Material)	2	Composite	F001-F005 Solvent Scan PCBs TCLP-TPH TCLP-Metals TCLP-VOC TCLP-SVOC	28 days
Water Disposal	Water (Tank Rinse/Decon Water)	1	Composite	Oil/Grease	10 days

#### **4.6 Sample Management**

Samples will be managed in accordance with Sections 4.12 and 5 of the *Comprehensive RFI Work Plan*.

#### **4.7 Sample Custody**

Sample custody will be maintained in accordance with Section 4.12.5 of the *Comprehensive RFI Work Plan*.

#### **4.8 Quality Assurance/Quality Control**

Quality assurance/quality control procedures to be followed during sampling activities will be in accordance with Section 4.14.2 of the *Comprehensive RFI Work Plan*.

#### **4.9 Decontamination Procedures**

Decontamination will be performed in accordance with Section 4.11 of the *Comprehensive RFI Work Plan*.

#### **4.10 Investigation Derived Waste**

Investigation-derived waste (IDW) will be handled in accordance with Section 4.13 of the *Comprehensive RFI Work Plan* and the *NSA Memphis IDW Management Plan* (E/A&H, 1995).

#### **5.0 POTENTIAL RECEPTORS**

SWMU 18 is approximately one mile west of the nearest offsite residence. The nearest NSA Memphis personnel are in the site area. Runoff from the SWMU flows to the south and west via the SWMU 4 storm sewer, which is approximately 1,000 feet south of SWMU 18 at its closest point. SWMU 4 ultimately empties into the North Fork Creek. SWMU 4 is related to drainage ways which are in populated areas of the base; therefore, the potential exists for contact by base personnel. Off base, the potential exists for contact by the general public due to unrestricted access to the drainage ways. According to base personnel, no fishing or swimming occurs in North Fork Creek or Big Creek, but children may play near these drainage ways.

Two drinking water production wells, PW-1 and PW-2, are near SWMU 18. PW-1 is approximately 1,200 feet west of SWMU 18, and PW-2 is approximately 500 feet southwest. Both production wells are screened in the Memphis Aquifer, with the Cook Mountain confining unit above the screened intervals. Potential receptors will be analyzed in detail in the RFI report if contamination is found at SWMU 18.

#### **6.0 QUALITY ASSURANCE PLAN**

The Quality Assurance Plan presented in Section 4.14 of the *Comprehensive RFI Work Plan* will be followed for sampling activities at SWMU 18.

#### **7.0 DATA MANAGEMENT PLAN**

The Data Management Plan presented in Section 5 of the *Comprehensive RFI Work Plan* will be followed for sampling activities at SWMU 18.

## 8.0 HEALTH AND SAFETY PLAN

Because E/A&H does not have responsibility for the tank removal, Southern Division's tank removal contractor shall provide a written health and safety plan for tank removal activities for its employees. The Health and Safety Plan shall meet, at a minimum, the requirements specified in the *Comprehensive Health and Safety Plan* (CHASP) and include all site-specific information concerning types of activities, site contaminants, etc. During all site activities, E/A&H personnel will comply with the CHASP (Section 7 of the *Comprehensive RFI Work Plan*), included as Appendix C, and the Site-Specific Health and Safety Plan (included as Appendix D).

## 9.0 REFERENCES

EnSafe/Allen & Hoshall. (September 1995). *Investigation — Derived Waste Management Plan* (NSA Memphis RFI). E/A&H: Memphis, Tennessee.

EnSafe/Allen & Hoshall. (October 1994). *Comprehensive RCRA Facility Investigation Work Plan*, Naval Air Station Memphis. E/A&H: Memphis, Tennessee.

ERC/EDGE. (September 1990). *RCRA Facility Assessment (RFA)*, NAS Memphis. ERC/EDGE: Nashville, Tennessee.

EnSafe/Allen & Hoshall. (June 1996). *Draft Assembly D Confirmatory Sampling Investigation Report*, Naval Air Station Memphis. E/A&H: Memphis, Tennessee.

EnSafe/Allen & Hoshall. (May 1996). *Draft Assembly C Confirmatory Sampling Investigation Report*, Naval Air Station Memphis. E/A&H: Memphis, Tennessee.

**Appendix A**  
**RCRA Facility Assessment — SWMU 18**

**7.18 SWMU NO. 18: N-112 UNDERGROUND WASTE TANK**

**7.18.1 UNIT CHARACTERISTICS**

**7.18.1.1 TYPE OF UNIT**

Active Underground Tank.

**7.18.1.2 DESIGN FEATURES**

This tank's capacity is 550 gallons; contents are waste oil and hydraulic fluid. The tank bottom is approximately 8 feet below grade, and it is anchored to an 8-inch thick concrete pad to prevent floatation in the event of high groundwater levels. Piping connected to the tank include feed lines which run from Building N-112 and a vent line which runs to the west side of Building N-112.

**7.18.1.3 OPERATING PRACTICE (PAST AND PRESENT)**

According to Department of the Navy information, this tank system is used to store waste oil and hydraulic fluid generated by the Ground Support Equipment (GSE) Shop. The shop repairs and maintains NAS vehicles used in aircraft maintenance.

**7.18.1.4 PERIOD OF OPERATION**

Tanks are in service.

**7.18.1.5 AGE OF UNIT**

Age of the tank is unknown.

**7.18.1.6 LOCATION OF UNIT**

Building N-112; see Figure 18-1.

**7.18.1.7 GENERAL PHYSICAL CONDITIONS**

General physical conditions of the UST is unknown.

**7.18.1.8 CLOSURE METHOD**

Not applicable at this time (active tank).

**7.18.2 WASTE CHARACTERISTICS**

**7.18.2.1 TYPE OF WASTE**

In addition to heavy hydrocarbons, waste material generated by this operation might contain volatile petroleum constituents such as benzene, xylene, and toluene; heavy metals such as lead and chromium; and possibly PCBs.

#### **7.18.2.2 MIGRATION CHARACTERISTICS**

Wastes such as those previously characterized in this description are reasonably mobile in the environment. Preliminary investigation of this SWMU indicates the most likely release mechanism to be leaking underground tanks or product lines. Therefore, the release point is likely to be below grade. Surface infiltration of rain water can transport these wastes into the soil and groundwater.

#### **7.18.2.3 TOXICOLOGICAL CHARACTERISTICS**

Used engine oil and hydraulic fluid include toxic volatile and semivolatile organics, toxic polynuclear aromatic hydrocarbons, and heavy metals (lead, cadmium). Organic constituents include known and suspected carcinogens, and toxic liquids and vapors. Acute effects of exposure may include nausea, vomiting, dizziness, drowsiness, central nervous system, depression, or damage to nerves, liver, or kidney.

#### **7.18.2.4 PHYSICAL/CHEMICAL CHARACTERISTICS**

Substances remaining in the tanks would be in the form of liquids or semiliquids/sludges. Substances that may have leaked from the tanks could exist as waste-saturated soils or soil moisture/groundwater contaminants.

#### **7.18.3 MIGRATION PATHWAYS**

##### **7.18.3.1 GEOLOGIC SETTING**

See Section 3.2.

##### **7.18.3.2 HYDROGEOLOGIC SETTING**

See Section 3.3.

##### **7.18.3.3 ATMOSPHERIC CONDITIONS**

See Section 4.0.

##### **7.18.3.4 TOPOGRAPHIC CHARACTERISTICS**

See Section 3.1 for general information. The area has been disturbed by past activities, but is generally level. Surface drainage is toward the south and west.

##### **7.18.3.5 PATHWAYS**

###### **AIR**

Because no surface releases of waste oil are evident at this location, it is felt that air is not a transport mechanism.



## SOIL

Should a leak exist, hazardous constituents of the waste oils and fluids at this location would likely be released into the soil mass around and beneath the tank. Soil particle bonding, which naturally exists in the silt and clay type soils typical to this area, provide strong attenuation for these potential contaminants. Minor releases from this system would be trapped in the vadose soil zone until natural driving forces are exerted (surface water infiltration) to transport these substances to the groundwater surface.

## SURFACE WATER/SEDIMENT

Preliminary evaluation of the UST system at SWMU No. 18 indicates no obvious points of surface contamination attributable to this unit. Therefore, the likelihood of surface water transport is remote.

## GROUNDWATER

Contaminants contained in the UST at this SWMU are slightly soluble in water expected to be lighter. They would be transported generally down gradient with the flow of groundwater.

## SUBSURFACE GAS

Not applicable.

### 7.18.4 CONTAMINANT RELEASE IDENTIFICATION

#### 7.18.4.1 PRIOR INSPECTION REPORTS

None available.

#### 7.18.4.2 PUBLIC COMPLAINTS

None.

#### 7.18.4.3 MONITORING/SAMPLING DATA

Waste oil is tested for PCBs prior to final disposal. No PCBs have ever been detected.

#### 7.18.4.4 EVIDENCE OF RELEASE

None.

#### **7.18.5 EXPOSURE POTENTIAL**

##### **7.18.5.1 PROXIMITY TO AFFECTED POPULATION**

The SWMU is located in the NAS North Side industrial area, which is distant from the NAS permanent population.

##### **7.18.5.2 PROXIMITY TO SENSITIVE ENVIRONMENTS**

The unit is distant from sensitive environments.

##### **7.18.5.3 LIKELIHOOD OF MIGRATION TO POTENTIAL RECEPTORS**

It has not been previously determined whether a release of hazardous material has occurred from this tank system.

#### **7.18.6 DOCUMENTS REVIEWED**

See PRD.

#### **7.18.7 SUMMARIZED DATA GAP**

##### **7.18.7.1 SOIL**

No available data.

##### **7.18.7.2 GROUNDWATER**

No available groundwater monitoring data.

##### **7.18.7.3 SURFACE WATER/SEDIMENT**

No available data. Surface water/sediment sampling is not needed for this site.

##### **7.18.7.4 AIR**

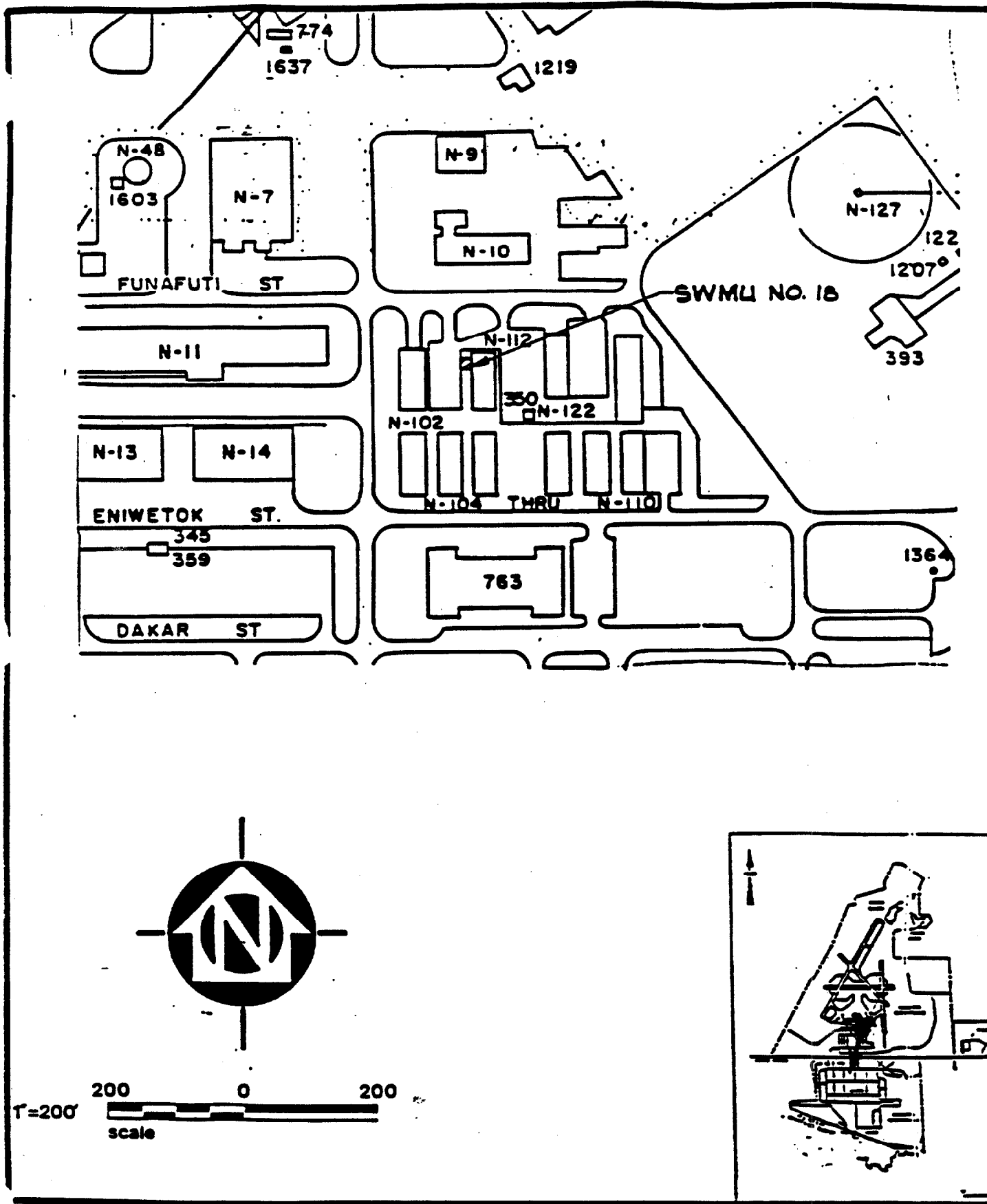
No air sampling is needed.

##### **7.18.7.5 SUBSURFACE GAS**

Not applicable.

#### **7.18.8 RECOMMENDED ACTIONS**

This site has been determined to require a RCRA Facility Investigation (preliminary sampling and analysis) by SOUTH DIV NAVFACENCOM, EPA Region IV, and the Tennessee Department of Health and Environment.



**SWMU NO. 18  
FIGURE 7-18**

**N-112 UNDERGROUND WASTE TANK  
LOCATION MAP**

**Appendix B**  
**Sections 01560, 02050, 02082, 02220, and Revisions to**  
**Storage Tanks and Solid Waste Management Units Removal**  
**at the NSA Memphis, Millington, Tennessee**

REVISIONS TO SPECIFICATION 06-96-0720  
STORAGE TANKS & SOLID WASTE MANAGEMENT UNITS REMOVAL/NSA/MEMPHIS

April 16, 1996

Section 01300, page 8, 1.5 QUANTITY OF SUBMITTALS

add:

Copies of all submittals shall be provided to the ROICC at the following address:

Resident Officer in Charge of Construction  
Attn: Ken Fulmer  
Bldg 766  
Naval Support Activity Memphis  
Millington, TN 38054-0007

The ROICC, in turn, shall forward copies to the following distribution list:

Commanding Officer  
Southern Division  
Naval Facilities Engineering Command  
Attn: Shirley Berry, Code 02328B  
2155 Eagle Drive, PO Box 190010  
North Charleston, SC 29419-9010

EnSafe/Allen & Hoshall  
Attn: John Stedman  
5724 Summer Trees Drive  
Memphis, TN 38134

Mr. Randy Wilson  
Naval Support Activity Memphis  
Code 01010 (Public Works, Environmental)  
7800 Third Avenue  
Millington, TN 38054-2053

Section 01400, page 7, 1.11.1. Testing Laboratory Requirements

add:

Contractor shall use a State of Tennessee approved laboratory.

Section 01560, page 15, 3.5.1. Hazardous Waste/Debris Management

add:

**Non-SWMU sites:** All excavated soil from non-SWMU sites which is shown to be unsuitable for disposal at BFI landfill, or shown to be a hazardous waste, through laboratory testing shall be containerized in bulk roll-off containers. Containers will be provided by the Government. Containers shall be labeled in accordance with the regulations as to content. The Government shall dispose of all excavated soils unsuitable for disposal at BFI landfill or shown to be a hazardous waste.

**SWMU sites (including tank pits):** All excavated soils from SWMU sites shall be immediately containerized in bulk roll-off containers. Soil and concrete/rubble shall be placed in separate containers. Containers shall be provided by the Contractor. Should laboratory testing show that excavated soil from SWMU sites is unsuitable for disposal at BFI Landfill, or shown to be a hazardous waste, Contractor shall transfer soil from containers into bulk roll-off containers provided by the

Government. Bulk containers shall be labeled in accordance with the regulations as to content. The Government shall dispose of all excavated soils unsuitable for disposal at BFI landfill or shown to be a hazardous waste. Should containers provided by the Contractor require decontamination after transfer of soil, Contractor shall decontaminate and place rinsate water in containers provided by the Contractor, labeled in accordance with the regulations. Containers generated from the decontamination process shall be transported by the Contractor to Building 1694, Part B Permitted Hazardous Waste Storage Facility at NSA Memphis. Disposal shall be by the Government through DRMO.

Section 02050, page 1, 1.3.1.1. Required Data

add:

Demolition plan shall include sampling requirements.

Section 02050, page 2, 3.2. Disposition of Material

add:

Any material determined by testing to be hazardous waste shall be containerized and labeled in accordance with the regulations showing type of contaminants and delivered to Building 1694, Part B Permitted Hazardous Waste Storage Facility at NSA Memphis. Disposal shall be by the Government through DRMO.

Section 02082, page 3, 1.3.2.c. Closure report

add:

Closure report shall contain the application for permanent closure of the tank, permanent closure report forms, and any other TDEC applications and forms required for closure.

Section 02082, page 5, 3.1. REMOVAL AND DISPOSAL OF TANKS

add:

The Contractor shall locate and mark all utilities at each site prior to excavation.

Section 02082, page 7, 3.15.1. Tank Removal and Closure

delete:

Tank No. 1695 and Tank No. 1696

add:

After removal from service, aboveground tank No. 340 shall be triple-rinsed and left on site.

Section 02082, page 8, 3.15.2. Fuel Removal

delete:

Dispose of remaining fuel emulsions in accordance with applicable local, State, and Federal regulations.

add:

Containerized fuel shall be sampled and tested to determine suitability for recycling. Recyclable fuels shall be transported to an EPA and/or State permitted off-site facility for recycling. Contractor shall

provide the Contracting Officer with a copy of the manifest and other appropriate records for all recycled waste fuels. Non-recyclable waste fuels shall be transported to Building 1694, Part B Permitted Hazardous Waste Storage Facility, for disposal by the Government.

Section 02082, page 8, 3.15.3, Tank Pits, first paragraph

delete:

...,therefore, An Interim Measure Work Plan (IMWP) must be prepared before closure of this unit. SWMU guidelines are provided in the TCP, Section 3.0.

add:

The tank pits will be removed in accordance with a Technical Memorandum approved by TDEC and EPA Region IV. The Technical Memorandum will be developed by EnSafe, Allen and Hoshall, and provided to the Contractor by the Contracting Officer. The Technical Memorandum will detail the requirements for removal of the pits, sampling, and handling the soil removed from the pits. Additional guidelines for the removal of the pits are provided in the TCP, section 3.0. All sampling and testing shall be conducted by EnSafe, Allen and Hoshall. The soil shall be immediately placed in bulk roll-off containers provided by the Contractor. Piping between the pits and the original gasoline storage tanks will be capped at the edge of excavation pit and left in place.

Section 02082, page 8, 3.15.3, Tank Pits, second paragraph

delete:

Prepare a RCRA Facility Assessment (RFA) which includes soil and groundwater sampling results for SWMU 7 and soil data for SWMU 3. Each of these sites will require an Interim Measure Work Plan.

add:

The dry wells will be removed in accordance with a Voluntary Corrective Action Workplan for each of the sites, approved by TDEC and EPA Region IV. The workplans will be developed by EnSafe, Allen and Hoshall, and provided to the Contractor by the Contracting Officer. All sampling and testing shall be conducted by EnSafe, Allen and Hoshall.

add (new paragraph):

Waste oil tank N-112 will be removed and sampled in accordance with a Voluntary Corrective Action Workplan, approved by TDEC and EPA Region IV. The workplan will be developed by EnSafe, Allen and Hoshall, and provided to the Contractor by the Contracting Officer. All sampling and testing shall be conducted by EnSafe, Allen and Hoshall.

Section 02082, page 8, 3.17.1, Excavation Procedures

delete:

Soils with OVA/FID readings less than 10 ppm may be used as backfill.

add:

Clean soil shall be used to backfill the tank pits. Only laboratory analysis data shall be used to classify soil as clean or contaminated. FID readings are not acceptable as proof of cleanliness.

Section 02082, page 8, TEMPORARY CONTAINMENT OF EXCAVATED SOIL

add:

In accordance with the Voluntary Corrective Action Plans (SWMUs) and the Technical Memorandum (tank pits) soil removed from the SWMUs and the tank pits will be immediately placed in bulk roll-off containers provided by the Contractor.

Section 02082, page 9, 3.17.2, Excavation Methods

replace: "TEC" with: TDEC

replace: "Glenn Birdwell" with: Glenn Birdwell

Section 02082, page 9, 3.18.1, Stockpiled Soils

replace: "EPA Method 418.1" with: EPA Method 418.1 (soil from waste/used oil tanks only)

add:

Soils at diesel fuel or #2 fuel oil tanks shall be tested for diesel range TPH (DRO-TPH). Soils at gasoline tanks shall be tested for GRO-TPH and BTEX.

delete:

For stockpiled soils, provide a minimum of one test for every 20 cubic yards for TPH, and one test for every 20 cubic yards for BTEX and TCLP.

add:

Soil in the stockpile shall be sampled in accordance with Tennessee Technical Guidance Document (TGD) 005. If the analysis indicated the soil is suitable for disposal at BFI Landfill, the Contractor shall manifest the transportation and disposal of the materials to the landfill. If the analyses indicate the soil is unsuitable for disposal at BFI Landfill or is not a hazardous waste, the soil shall be placed in bulk roll-off containers provided by the Government. The Government will arrange for the disposal of the material through DRMO. The Contractor shall label the containers in accordance with the regulations.

Section 02082, page 10, 3.18.2, Testing Under Tank After Removal of Tank

replace entire paragraph with:

Location, number of samples collected, and analyses performed on soils in the tank pits after removal of tanks shall be in accordance with figure 4.1 of the Tank Closure Plan and the Tennessee Tank Closure Guidelines.

Section 02082, page 10, 3.18.3, Testing Along Piping

delete:

"...TPH, BTEX, and TCLP"

add:

...DRO-TPH (diesel fuel pipelines) or GRO-TPH, BTEX, and lead (for gasoline fuel pipelines).



Section 02082, page 10, 3.20, SECURING TANK SYSTEM

add:

Tank systems shall be secured in accordance with API PUBL 2015 in conjunction with the Tennessee Tank Closure Guidelines.

Section 02082, page 10, 3.20.a.(2)

replace entire paragraph with:

Remove liquids and sludge from tanks. The Contractor shall analyze any water, waste fuels, sediment, and sludge removed from the tanks to determine their hazardous characteristics. Waste removed from fuel tanks shall be analyzed for flash point, TCLP for benzene and TCLP for lead. Waste removed from waste oil tanks shall be analyzed for flash point, TCLP for benzene and TCLP for eight (8) RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver). Hazardous wastes shall be packaged, labeled, stored and transported in DOT-approved containers in accordance with the regulations. Contractor shall deliver hazardous waste to Building 1694, Part B Permitted Hazardous Waste Storage Facility, for disposal by the Government. Recyclable fuels shall be transported to an EPA and/or State permitted off-site facility for recycling. Contractor shall provide the Contracting Officer with a copy of the manifest and other appropriate records for all recycled waste fuel. Non-recyclable waste fuels shall be transported to Building 1694, Part B Permitted Hazardous Waste Storage Facility, for disposal by the Government.

Section 02082, page 12, 3.23(c)

add:

Site plans shall include a cross-sectional view as part of the tank pits.

## SECTION 01560

TEMPORARY CONTROLS  
09/95

## PART 1 GENERAL

## 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

## CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.120	Hazardous Waste Operations and Emergency Response under OSHA
29 CFR 1926	Safety and Health Regulations for Construction
40 CFR 241	Guidelines for Disposal of Solid Waste
40 CFR 243	Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste
40 CFR 258	Subtitle D Landfill Requirements
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Generators of Hazardous Waste
40 CFR 263	Transporters of Hazardous Waste
40 CFR 264	Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standard for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 266	Standards for the Management of Specific Hazardous Waste and Specific Types of Hazardous Waste Management Facilities
40 CFR 268	Land Disposal Restrictions
40 CFR 279	Used Oil Regulations
40 CFR 300	National Oil and Hazardous Substances Pollution Contingency Plan

40 CFR 372-SUBPART D                      EPA Toxic Chemical Release Reporting Regulations

49 CFR 178                                      Shipping Container Specification

CORPS OF ENGINEERS (COE)

COE EM-385-1-1                              1992 Safety and Health Requirements Manual

MILITARY SPECIFICATIONS (MIL)

MIL-S-16165                                  (Rev. E) Shielding Harnesses, Shielding Items and Shielding Enclosures for Use in the Reduction of Interference from Engine Electrical Systems

MILITARY STANDARDS (MIL-STD)

MIL-STD-461                                  (Rev. D) Control and Susceptibility of Electromagnetic Interference

MIL-STD-462                                  Electromagnetic Interference Characteristics

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 101                                      1994 Code for Safety to Life from Fire in Buildings and Structures

NFPA 241                                      1993 Safeguarding Construction, Alteration, and Demolition Operations

1.2 DEFINITIONS

1.2.1 Sediment

Soil and other debris that have eroded and have been transported by runoff water or wind.

1.2.2 Solid Waste

Garbage, refuse, debris, sludge, or other discharged material (except hazardous waste as defined in paragraph entitled "Hazardous Waste" or hazardous debris as defined in paragraph entitled "Hazardous Debris"), including solid, liquid, semisolid, or contained gaseous materials resulting from domestic, industrial, commercial, mining, or agricultural operations. Material not regulated as solid waste are: nuclear source or byproduct materials regulated under the Federal Atomic Energy Act of 1954 as amended; suspended or dissolved materials in domestic sewage effluent or irrigation return flows, or other regulated point source discharges; regulated air emissions; and fluids or wastes associated with natural gas or crude oil exploration or production.

### 1.2.3 Debris

Non-hazardous solid material generated during the construction, demolition, or renovation of a structure which exceeds 2.5 inch particle size that is: a manufactured object; plant or animal matter; or natural geologic material (e.g. cobbles and boulders). A mixture of debris and other material such as soil or sludge is also subject to regulation as debris if the mixture is comprised primarily of debris by volume, based on visual inspection.

### 1.2.4 Hazardous Debris

Debris as defined in paragraph 1.2.3, Debris, of this section that contains listed hazardous waste (either on the debris surface, or in its interstices, such as pore structure) per 40 CFR 261; or debris that exhibits a characteristic of hazardous waste per 40 CFR 261.

### 1.2.5 Chemical Wastes

This includes salts, acids, alkalies, herbicides, pesticides, and organic chemicals.

### 1.2.6 Garbage

Refuse and scraps resulting from preparation, cooking, dispensing, and consumption of food.

### 1.2.7 Hazardous Waste

Hazardous waste as defined in 40 CFR 261 or as defined by applicable state and local regulations.

### 1.2.8 Oily Waste

Petroleum products and bituminous materials.

### 1.2.9 Class I Ozone Depleting Substance (ODS)

Class I ODS is defined in Section 602(a) of The Clean Air Act and includes the following chemicals:

chlorofluorocarbon-11 (CFC-11)	chlorofluorocarbon-213 (CFC-213)
chlorofluorocarbon-12 (CFC-12)	chlorofluorocarbon-214 (CFC-214)
chlorofluorocarbon-13 (CFC-13)	chlorofluorocarbon-215 (CFC-215)
chlorofluorocarbon-111 (CFC-111)	chlorofluorocarbon-216 (CFC-216)
chlorofluorocarbon-112 (CFC-112)	chlorofluorocarbon-217 (CFC-217)
chlorofluorocarbon-113 (CFC-113)	halon-1211
chlorofluorocarbon-114 (CFC-114)	halon-1301
chlorofluorocarbon-115 (CFC-115)	halon-2402
chlorofluorocarbon-211 (CFC-211)	carbon tetrachloride
chlorofluorocarbon-212 (CFC-212)	methyl chloroform

### 1.2.10 Industrial Hygienist

An Industrial Hygienist that is certified by the American Board of Industrial Hygiene.

### 1.3 SUBMITTALS

Submit the following in accordance with Section 01300, "Submittals."

#### 1.3.1 SD-08, Statements

- a. Environmental protection plan G
- b. Safety Plan G

#### 1.3.2 SD-12, Field Test Reports

- a. Laboratory analysis

Submit a copy of a laboratory analysis of solid waste and debris with the potential of becoming classified as a hazardous waste (i.e. abrasive/sand blasting debris, etc.). The Contractor shall bear the cost of the waste stream determinations and the Contracting Officer reserves the right to request waste stream determinations on questionable waste streams. Determinations for such waste streams must provide written rational for whether the waste is hazardous or non-hazardous.

#### 1.3.3 SD-18, Records

Some of the records listed below are also required as part of other submittals. For the "Records" submittal, maintain a separate three-ring binder and submit at the completion of the project. Make separate parts to the binder corresponding to each of the subitems listed below.

- a. Preconstruction survey
- b. Solid waste disposal permit
- c. Disposal permit for hazardous waste
- d. Contractor 40 CFR employee training records
- e. Erosion and sediment control

##### 1.3.3.1 Preconstruction Survey

Perform a preconstruction survey of the project site with the Contracting Officer, and take photographs showing existing environmental conditions in and adjacent to the site. Submit a report for record.

##### 1.3.3.2 Solid Waste Disposal Permit

Submit one copy of a state and local permit or license showing such agencies' approval of the disposal plan before transporting wastes off Government property.

**1.3.3.3 Disposal Permit for Hazardous Waste**

Submit a copy of the applicable EPA and state permit(s), manifest(s), or license(s) for transportation, treatment, storage, and disposal of hazardous waste by permitted facilities.

**1.3.3.4 Contractor 40 CFR Employee Training Records**

Prepare to maintain employee training records throughout the term of the contract meet applicable 40 CFR requirements. Submit these training records to the Contracting Officer at the conclusion of the project, unless otherwise directed.

**1.3.3.5 Erosion and Sediment Control Inspection Procedures**

Submit "Erosion and Sediment Control Inspection Reports" to the Contracting Officer once every 7 calendar days and within 24 hours of a storm event that produces 0.5 inch or more of rain.

**1.4 CLASS I ODS PROHIBITION**

Class I ODS as defined and identified herein shall not be used in the performance of this contract, nor be provided as part of the equipment. This prohibition shall be considered to prevail over any other provision, specification, drawing, or referenced documents.

**1.5 ENVIRONMENTAL PROTECTION REQUIREMENTS**

Provide and maintain, during the life of the contract, environmental protection as defined. Plan for and provide environmental protective measures to control pollution that develops during normal construction practice. Plan for and provide environmental protective measures required to correct conditions that develop during the construction of permanent or temporary environmental features associated with the project. Comply with Federal, state, and local regulations pertaining to the environment, including water, air, solid waste, hazardous waste and substances, oily substances and noise pollution.

**1.5.1 Licenses and Permits**

Obtain licenses and permits pursuant to the "Permits and Responsibilities" FAR Clause except for those permits which will be obtained by the Contracting Officer as follows:

a. None

**1.5.2 Contractor Liabilities for Environmental Protection**

Pursuant to the "Permits and Responsibilities" Clause, (FAR Clause 52.236-7) the Contractor shall be responsible for obtaining all necessary licenses and permits; not previously obtained by the Government, and for full compliance with all Federal, State and local environmental laws and regulations applicable to the performance of work under the contract.

The Contractor is advised that the installation is subject to Federal,

State, and local regulatory agency inspections to review compliance with such environmental laws and regulations. The Contractor shall fully cooperate with any representative from any Federal, State or local regulatory agency who may visit the job site and shall provide immediate notification to the Contracting Officer, who shall accompany them on any subsequent site inspections. The Contractor shall complete, maintain, and make available to the Contracting Officer, public works or regulatory agency personnel all documentation relating to environmental compliance under applicable Federal, State and local laws and regulations.

The Contractor shall be responsible for all damages to persons or property resulting from Contractor fault or negligence as well as for the payment of any civil fines or penalties which may be assessed by any Federal, State or local regulatory agency as a result of the Contractor's or any subcontractor's violation of any applicable Federal, State or local environmental law or regulation. Should a Notice of Violation (NOV), Notice of Noncompliance (NON), Notice of Deficiency (NOD) or similar regulatory agency notice be issued to the Government as facility owner/operator on account of the actions or inactions of the Contractor or one of its Subcontractors in the performance of work under this contract, the Contractor shall fully cooperate with the Government in defending against regulatory assessment of any civil fines or penalties arising out of such actions or inactions.

#### 1.6 ENVIRONMENTAL PROTECTION PLAN

Five days after the award of contract, the Contractor shall meet with the Contracting Officer to discuss the proposed environmental protection plan and develop mutual understanding relative to the details of environmental protection, including measures for protecting natural resources, required reports, and other measures to be taken. The Environmental Protection Plan shall be submitted in the following format and shall, at a minimum, address the following elements (also refer to paragraph, Protection of Natural Resources, (paragraph 3.1) of this section):

##### a. Description of the Environmental Protection Plan

- (1) General overview and purpose
- (2) General site information

##### b. Protection of Natural Resources

- (1) Land resources
- (2) Tree protection
- (3) Replacement of damaged landscape features
- (4) Temporary construction
- (5) Stream crossings
- (6) Fish and wildlife resources

## (7) Wetland areas

## c. Protection of Historical and Archaeological Resources

## (1) Objectives

## (2) Methods

## d. Storm Water Management and Control

## (1) Ground cover

## (2) Erodible soils

## (3) Temporary measures

## (a) Mechanical retardation and control of runoff

## (b) Vegetation and mulch

## 1.6.1 Environmental Plan Review

Fourteen days after the environmental protection meeting, submit the proposed environmental plan for further discussion, review, and approval. Commencement of work shall not begin until the environmental plan has been approved.

## 1.7 SAFETY PROGRAM

The contractor is responsible for worker safety and shall implement a safety program conforming to the requirements of federal, state, and local laws, rules, and regulations. The program shall incorporate related requirements of the following:

- a. 29 CFR 1910.
- b. 29 CFR 1926.
- c. COE EM-385-1-1.
- d. Contract Clause "FAR 52.236-1, Accident Prevention."
- e. Contract Clause "FAR 52.223-3, Hazardous Material Identification and Material Safety Data."
- f. NFPA 101.
- g. NFPA 241.

## 1.7.1 Safety Plan

## 1.7.1.1 Safety Requirements

The Contractor shall provide for protecting the lives and health of employees and other persons and for preventing damage to property,



materials, supplies and equipment in accordance with the latest revision of the U.S. Army Corps of Engineers "Safety and Health Requirements Manuals" (EM-385-1-1). This manual shall be kept on the job site during performance of the work and readily accessible to the Contracting Officer. Copies of this manual may be obtained through the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. The written "accident prevention plan" shall be submitted for approval a minimum of 15 calendar days prior to the scheduled start of work at the job site. Work cannot proceed until the "accident prevention plan" has been approved by the Contracting Officer. Additionally, the Activity Hazard Analysis for each major phase of work shall be submitted for approval a minimum of 15 calendar days prior to the scheduled start of the phase work. Meet in conference with the Contracting Officer to discuss and develop a mutual understanding of the overall safety program.

#### 1.7.1.2 Health and Safety Plan (HASP) For Environmental Work

Health and Safety Plan (HASP) For Environmental Work Under The Scope Of 29 CFR 1910.120

Perform a Hazard Analysis and submit a detailed job-specific Health and Safety Plan for the work procedures to be used in the removal, demolition and disposal of materials. The plan shall be prepared, signed, and sealed, including certification number and date, by an industrial hygienist. Such plan shall include a sketch showing the location, size, and details of control area, location, and details of the decontamination systems. The plan shall also include interface of trades involved in the construction, sequencing of work, disposal plan, sampling protocols, testing labs, protective equipment, and a detailed description of the method to be employed in order to control pollution. The plan shall be approved prior to the start of work. Prior to beginning work, the contractor and industrial hygienist shall meet with the contracting Officer to discuss in detail the plan, including work procedures, and safety precautions. The HASP shall provide evidence of compliance with the requirements of 29 CFR 1910.120 and any other applicable federal, state or local health and safety requirements.

Industrial Hygienist: Submit the name, address, and telephone number of the Industrial Hygienist selected to prepare the Health and Safety plan, review and approve Contractor's training program, and develop the testing protocols to be followed by the testing laboratory. Submit documentation that the industrial hygienist is certified by the American Board of Industrial Hygiene, including certification number and date. The Industrial Hygienist shall be retained by the Contractor for the duration of the contract.

The site specific Health and Safety Plan shall meet the requirements of 29 CFR 1910.120 and as a minimum include the following:

- a. Establish to whom the Health and Safety will apply.
- b. Describe effort to be made to restrict site access during activities, and to maintain site communications. Provide a site map depicting work zones (hot zone, contamination reduction zone).

- c. Establish the minimum OSHA training requirements for personnel to take part in on-site activities and provide proof of training/certifications. All training requirements are to be consistent with 29 CFR 1910.120.
- d. Provide a hazard evaluation including, but not limited to: heavy equipment operations, chemical hazards, physical hazards, noise hazards and temperature hazards (heat/cold stress).
- e. Discuss standard safe work practices and personal protective equipment to be used as part of the project.
- f. Discuss in detail the conditions which will necessitate the upgrading of personnel protection and how it will be determined that these conditions exist (i.e. air monitoring program, visual/olfactory evidence of contamination).
- g. Describe all work limitations regarding work periods and restrictions on personnel allowed within work zones.
- h. Provide a description of exposure evaluation methods (i.e. ambient air monitoring), and medical evaluations to be conducted for all employees consistent with 29 CFR 1910.120. Provide proof of compliance with said regulations.
- i. Provide a description of all field instrumentation to be used in exposure evaluation and establish standard operating procedures for each. Indicate how this equipment will be used to determine whether upgraded personnel protection is necessary. Identify any interferant which may influence the response (+/-) of field instruments and discuss what actions will be taken to compensate for these influences.
- j. Describe personnel decontamination procedures to be employed for all field workers anticipated to come in contact with hazardous waste/materials on-site.
- k. Provide a list of health and safety equipment (i.e. first aid kits, fire extinguishers) to be available on-site.
- l. Establish health and safety management responsibilities and the chain-of-command in place for health and safety purposes.
- m. Provide an outline of topics to be discussed in the health and safety briefing to be held prior to initiation of activities in the work zones.
- n. Provide emergency information including, but not limited to: emergency contacts (i.e. fire, ambulance, hospitals) with addresses, phone numbers and facility contacts; site resources (communications systems, health and safety supplies, water sources); and emergency procedures (i.e. emergency response chain-of-events). Include a site locus map, along with written directions, showing the most effective route to local hospitals capable of treating general physical disability and/or chemical

exposures.

- p. Identify those individuals to be present on-site who are certified to administer CPR and first aid.
- q. Address the potential for snake infestation during warm weather providing auxiliary equipment (i.e. snake chaps).

#### 1.7.1.3 Affirmative Procurement Certification/Documentation

The Contractor shall certify and provide documentation to the Contracting Officer that the Contractor has an affirmative procurement program in place. The Contractor shall ensure that 100 percent of the Contractor purchases of currently designated EPA guideline items meet or exceed the EPA guidelines unless written justification is provided that a product is not available competitively within a reasonable time frame, does not meet appropriate performance standards, or is only available at an unreasonable price. The currently designated guideline items are: concrete and cement containing fly ash, recycled paper products, re-refined lubricating oil, retread tires, and insulation containing recovered materials.

#### 1.7.1.4 Hazardous Material

Federal Standard 313 (FED-STD-313), "Material Safety Data, Transportation Data, and Disposal Data for Hazardous Materials Furnished to Government Activities," defines hazardous materials and establishes requirements for preparing Material Safety Data Sheets (MSDS) for the hazardous materials. Any material, item, or substance proposed for use which conforms to the definition of a hazardous material as prescribed by FED-STD-313 shall be considered a hazardous material and shall be provided with a MSDS.

#### 1.7.1.5 Hazardous Material Use

Each hazardous material shall be identified to the Contracting Officer through a submittal of the MSDS and shall be subject to use only as permitted by the Contracting Officer. The safety plan shall incorporate provisions to deal with hazardous materials, pursuant to the Contract Clause "FAR 52.223-3, Hazardous Identification and Material Safety Data." With respect to hazardous materials, the safety plan shall consist of:

- a. An index of hazardous materials to be introduced to the site;
- b. An estimate of the quantities of hazardous materials required for use on the jobsite;
- c. An initial log or listing, which is to be kept current for any changes thereto, showing: maximum quantity of each hazardous material that was present at any one time, dates the material was present, amount of each material used, and how the material was used;
- d. Plan for protecting personnel and property during the transport, storage and use of the materials;
- e. Procedures for spill response and disposal;

- f. Material Safety Data Sheets for materials listed in the index of the plan and not required in the technical section of the specification. Post Material Safety Data Sheets at the worksite where the products will be used.
- g. Approved labeling system to identify contents on all containers on site;
- h. Personnel training plan.

Each hazardous material must receive approval prior to bringing onto the job site or prior to any other use in conjunction with this contract. Each hazardous material use shall be in a manner that will ensure that the amount of hazardous waste generated will be minimized. Allow a minimum of 10 working days for Contracting Officer processing of the request for use of a hazardous material.

#### 1.7.1.6 Hazardous Material Exclusions

Notwithstanding any other hazardous material permitted used in this contract, radioactive materials or instruments capable of producing ionizing radiation as well as materials which contain asbestos, mercury, or polychlorinated biphenyls are prohibited. Exceptions to the use of any of the above excluded materials may be considered by the Contracting Officer upon written request by the Contractor.

#### 1.7.1.7 Work in Confined Spaces

Work in this contract may require operations within confined spaces. A written Confined Space Entry Procedure (CSEP) must be submitted for Contracting Officer Approval. The CSEP shall identify the name and qualifications of the competent person responsible for testing the confined space work environment along with the listing of other requirements of EM-385-1-1. Allow a minimum of 5 working days prior to planned work in the confined space to permit processing of the CSEP and for obtaining any additional station permits as may be required.

- a. Entry into a confined or enclosed space by personnel for any purpose, including hot work, shall be prohibited until the qualified person has conducted appropriate tests to ensure the confined or enclosed space is safe for the work intended.
  - (1) Confined Space. Refers to a space which by design has limited openings for entry and exit; unfavorable natural ventilation which could contain or produce dangerous air contaminants, or which is not intended for continuous occupancy. Confined spaces include but are not limited to storage tanks, compartments of ships, process vessels, pits, silos, vats, degreasers, reaction vessels, boilers, ventilation and exhaust ducts, sewers, tunnels, underground utility vaults, and pipelines.
  - (2) Qualified Person. A person designated by the Contractor, in writing, as capable (by education or specialized training) of

anticipating, recognizing, and evaluating employee exposure to hazardous substances or other unsafe conditions in a confined space. This person shall be capable of specifying necessary control and protective action to ensure worker safety. Where work involves combustible and hazardous materials, this qualified person shall be a NFPA certified marine chemist.

- b. The qualified person and all contractor personnel shall comply with the station confined space entry permit system. The permit shall be posted in a conspicuous place close to the confined space entrance with a copy to the Contracting Officer.
- c. Submit to Contracting Officer a letter of certification for the qualified person. The letter shall state the qualified person's name and qualifications and delineate the qualified person's authority to direct work stoppage in the event of hazardous conditions.

#### 1.7.2 Unforeseen Hazardous Material

If material that is not indicated on the drawings is encountered that may be dangerous to human health upon disturbance during construction operations, stop that portion of work and notify the Contracting Officer immediately. Intent is to identify materials such as PCB, lead paint, and friable and nonfriable asbestos. Within 14 calendar days the Government will determine if the material is hazardous. If the material is not hazardous or poses no danger, the Government will direct the Contractor to proceed without change. If the material is hazardous and handling of the material is necessary to accomplish the work, the Government will issue a modification pursuant to "FAR 52.243-4, Changes" and "FAR 52.236-2, Differing Site Conditions."

#### 1.7.3 Station Permits

Permits are required for, but are not necessarily limited to, welding, digging, and burning.

#### 1.7.4 Forms

Submit OSHA Form 101, OSHA Form 200, or other forms that contain the same information for each recordable occupational injury or illness (first aid cases are not recordable), lost time accident or property damage of \$1,000 or more resulting from jobsite accidents within 6 days of an accident. Notify the Contracting Officer immediately by telephone of fatalities, major accidents resulting in three or more disabling injuries, or property damage/material losses over \$100,000 for each accident.

### PART 2 PRODUCTS

Not used.

**PART 3 EXECUTION****3.1 PROTECTION OF NATURAL RESOURCES**

Preserve the natural resources within the project boundaries and outside the limits of permanent work. Restore to an equivalent or improved condition upon completion of work. Confine construction activities to within the limits of the work indicated or specified.

**3.1.1 Land Resources**

Except in areas to be cleared, do not remove, cut, deface, injure, or destroy trees or shrubs without the Contracting Officer permission. Do not fasten or attached ropes, cables, or guys to existing nearby trees for anchorages unless authorized by the Contracting Officer. Where such use of attach ropes, cables, or guys is authorized, the Contractor shall be responsible for any resultant damage.

**3.1.1.1 Protection**

Protect existing trees which are to remain and which may be injured, bruised, defaced, or otherwise damaged by construction operations. Remove displaced rocks from uncleared areas. By approved excavation, remove trees with 30 percent or more of their root systems destroyed.

**3.1.1.2 Replacement**

Remove trees and other landscape features scarred or damaged by equipment operations, and replace with equivalent, undamaged trees and landscape features. Obtain Contracting Officer's approval before replacement.

**3.1.2 Water Resources****3.1.2.1 Oily and Hazardous Substances**

Prevent oily or other hazardous substances from entering the ground, drainage areas, or local bodies of water. For oil, fuel oil, or other hazardous substance spills, verbally notify the Contracting Officer immediately. Surround all temporary fuel oil or petroleum storage tanks with a temporary earth berm of sufficient size and strength to contain the contents of the tanks in the event of leakage or spillage.

**3.1.3 Fish and Wildlife Resources**

Do not disturb fish and wildlife. Do not alter water flows or otherwise significantly disturb the native habitat adjacent to the project and critical to the survival of fish and wildlife, except as indicated or specified.

**3.2 HISTORICAL AND ARCHAEOLOGICAL RESOURCES**

Carefully protect in-place and report immediately to the Contracting Officer historical and archaeological items or human skeletal remains discovered in the course of work. Stop work in the immediate area of the discovery until directed by the Contracting Officer to resume work.

### 3.3 EROSION AND SEDIMENT CONTROL MEASURES

#### 3.3.1 Burnoff

Burnoff of the ground cover is not permitted.

#### 3.3.2 Protection of Erodible Soils

Immediately finish the earthwork brought to a final grade, as indicated or specified. Immediately protect the side slopes and back slopes upon completion of rough grading. Plan and conduct earthwork to minimize the duration of exposure of unprotected soils.

#### 3.3.3 Temporary Protection of Erodible Soils

Use the following methods to prevent erosion and control sedimentation:

##### 3.3.3.1 Mechanical Retardation and Control of Runoff

Mechanically retard and control the rate of runoff from the construction site. This includes construction of diversion ditches, benches, berms, and use of silt fences and straw bales to retard and divert runoff to protected drainage courses.

##### 3.3.3.2 Sediment Basins

Trap sediment in temporary sediment basins. Select a basin size to accommodate the runoff of a local 10-year storm. Pump dry and remove the accumulated sediment, after each storm. Use a paved weir or vertical overflow pipe for overflow. Remove collected sediment from the site. Institute effluent quality monitoring programs.

##### 3.3.3.3 Vegetation and Mulch

Provide temporary protection on sides and back slopes as soon as rough grading is completed or sufficient soil is exposed to require erosion protection. Protect slopes by accelerated growth of permanent vegetation, temporary vegetation, mulching, or netting. Stabilize slopes by hydroseeding, anchoring mulch in place, covering with anchored netting, sodding, or such combination of these and other methods necessary for effective erosion control.

- a. Seeding: Provide new seeding where ground is disturbed. Include topsoil or nutriment during the seeding operation necessary to establish reestablish a suitable stand of grass.

### 3.4 CONTROL AND DISPOSAL OF SOLID WASTES

Pick up solid wastes, and place in covered containers which are regularly emptied. Do not prepare or cook food on the project site. Prevent contamination of the site or other areas when handling and disposing of wastes. At project completion, leave the areas clean. Recycling is encouraged and can be coordinated with the Contracting Officer and the activity recycling coordinator. Remove all solid waste (including

non-hazardous debris) from Government property and dispose off-site at an approved landfill. Solid waste disposal off-site must comply with most stringent local, state, and federal requirements including 40 CFR 241, 40 CFR 243, and 40 CFR 258.

### 3.5 CONTROL AND DISPOSAL OF HAZARDOUS WASTES

#### 3.5.1 Hazardous Waste/Debris Management

Hazardous waste/debris shall be identified, labeled, handled, stored, and disposed of in accordance with all federal, state, and local regulations including 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, 40 CFR 268, and 40 CFR 279.

Hazardous waste shall also be managed in accordance with the approved Hazardous Waste Management Section of the Environmental Protection Plan. Store hazardous wastes in approved containers in accordance with 49 CFR 178. Hazardous waste generated within the confines of Government facilities shall be identified as being generated by the Government and shall not be removed from Government property. Prior to removal of any hazardous waste from Government property, all hazardous waste manifests must be signed by activity personnel from the Environmental Office. No hazardous waste shall be brought onto Government property. Provide to the Contracting Officer a copy of any laboratory analysis for solid waste streams that have any potential to be hazardous waste or contain any chemical constituents listed in 40 CFR 372-SUBPART D. For hazardous wastes spills, verbally notify the Contracting Officer immediately.

#### 3.5.2 Hazardous Waste Minimization

The Contractor shall actively pursue minimizing the generation of hazardous waste while on-base. The Hazardous Waste Management Section of the Environmental Protection Plan shall include the Contractor's procedures for hazardous waste minimization. For preparing this part of the plan, the Contractor may consult the activity Environmental Office for suggestions and to obtain a copy of the pollution prevention/hazardous waste minimization plan for reference material. If no written plan exists, the Contractor may obtain information by contacting the Contracting Officer. The Contractor shall describe the types of the hazardous materials expected to be used in the construction when inquiring for information.

#### 3.5.3 Hazardous Material Control

The Contractor shall include hazardous control procedures in the Safety Plan. The procedures shall address and ensure the proper handling of hazardous materials, including the appropriate transportation requirements. The Contractor shall submit a Material Safety Data Sheet (MSDS) and estimated quantities to be used for each hazardous material to the Contracting Officer prior to bringing the material on base. At the end of the project, the Contractor shall provide the Contracting Officer with the maximum quantity of each material that was present at the site at any one time, the dates the material was present, the amount of each material that was used during the project, and how the material was used. The Contractor shall also ensure that hazardous materials are utilized in a manner that will minimize the amount of hazardous waste that is generated. The Contractor shall ensure that all containers of hazardous materials have



NFPA labels or their equivalent. Copies of the MSDS for hazardous materials shall be kept on site at all times and provided to the Contracting Officer at the end of the project. The Contractor shall certify that all hazardous materials removed from the site are hazardous materials and do not meet the definition of hazardous waste per 40 CFR 261.

#### 3.5.4 Petroleum Products

Conduct the fueling and lubricating of equipment and motor vehicles in a manner that protects against spills and evaporation. All used oil generated on site shall be managed in accordance with 40 CFR 279. The Contractor shall determine if any used oil generated, while on-site, exhibits a characteristic of hazardous waste. In addition, used oil containing 1000 parts per million of solvents will be considered a hazardous waste and disposed of at Contractor's expense. Used oil mixed with a hazardous waste will also be considered a hazardous waste. All hazardous waste will be managed in accordance with the paragraph titled Hazardous Waste/Debris Management of this section, and shall be managed in accordance with the approved Environmental Protection Plan.

#### 3.5.5 Spills of Oil and Hazardous Materials

Take precautions to prevent spills of oil and hazardous material. In the event of a spill, immediately notify the Contracting Officer. Spill response shall be in accordance with 40 CFR 300 and applicable state regulations.

#### 3.6 DUST CONTROL

Keep dust down at all times, including during nonworking periods. Sprinkle or treat, with dust suppressants, the soil at the site, haul roads, and other areas disturbed by operations. Dry power brooming will not be permitted. Instead, use vacuuming, wet mopping, wet sweeping, or wet power brooming. Air blowing will be permitted only for cleaning nonparticulate debris such as steel reinforcing bars. Only wet cutting will be permitted for cutting concrete blocks, concrete, and bituminous concrete. Do not unnecessarily shake bags of cement, concrete mortar, or plaster.

#### 3.7 NOISE

Make the maximum use of low-noise emission products, as certified by the EPA. Blasting or use of explosives will not be permitted without written permission from the Contracting Officer, and then only during the designated times.

#### 3.8 RESTRICTIONS ON EQUIPMENT

##### 3.8.1 Electromagnetic Interference Suppression

- a. Electric Motors: Motors shall comply with MIL-STD-461 relative to radiated and conducted electromagnetic interference. A test for electromagnetic interference will not be required for motors that are identical physically and electrically to those that have previously met the requirements of MIL-STD-461. An

electromagnetic interference suppression test will not be required for electric motors without commutation or sliprings having no more than one starting contact and operated at 3,600 revolutions per minute or less.

- b. Contractor's Construction Equipment: Equipment used by the Contractor shall comply with MIL-S-16165 for internal combustion engines and MIL-STD-461 for other devices capable of producing radiated or conducted interference.
- c. Tests for Electromagnetic Interference Suppression: Conduct tests on electric motors and the Contractor's construction equipment in accordance with MIL-STD-461 and MIL-STD-462. The test location shall be reasonably free from radiated and conducted interference. Furnish the testing equipment, instruments, and personnel for making the tests; a test location; and other necessary facilities.

### 3.8.2 Radio Transmitter Restrictions

Conform to the restrictions and procedures for the use of radio transmitting equipment, as directed. Do not use transmitters without prior approval.

## 3.9 FIRE PROTECTION

### 3.9.1 Compliance

COE EM-385-1-1, NFPA 241, and activity fire regulations. Obtain approval from the activity Fire Chief prior to commencement of hot work operations.

### 3.9.2 Notification of Fire

Post the activity fire poster in conspicuous locations and at telephones in construction shacks.

-- End of Section --

SECTION 01700

PROJECT CLOSEOUT  
09/95

PART 1 GENERAL

1.1 PROJECT RECORD DOCUMENTS

1.1.1 As-Built Drawings

Section 00711 or 00721, paragraph "FAC 5252.236-9310, Record Drawings."

1.2 CLEANUP

Leave premises "broom clean." Clean interior and exterior glass surfaces exposed to view; remove temporary labels, stains and foreign substances; polish transparent and glossy surfaces; vacuum carpeted and soft surfaces. Clean equipment and fixtures to a sanitary condition. Clean Replace filters of operating equipment. Clean debris from roofs, gutters, downspouts and drainage systems. Sweep paved areas and rake clean landscaped areas. Remove waste and surplus materials, rubbish and construction facilities from the site.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

## SECTION 02050

DEMOLITION AND REMOVAL  
06/93

## PART 1 GENERAL

## 1.1 REFERENCES

## AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A10.6

1983 Demolition Operations - Safety  
Requirements

## 1.2 GENERAL REQUIREMENTS

Do not begin demolition until authorization is received from the Contracting Officer. Remove rubbish and debris from the station daily. Store materials that cannot be removed daily in areas specified by the Contracting Officer.

## 1.3 SUBMITTALS

Submit the following in accordance with Section 01300, "Submittals."

## 1.3.1 SD-08, Statements

## a. Demolition plan

Submit proposed demolition and removal procedures to the Contracting Officer for approval before work is started.

## 1.3.1.1 Required Data

Demolition plan shall include procedures for careful removal and disposition of materials specified to be salvaged, coordination with other work in progress, a disconnection schedule of utility services, and a detailed description of methods and equipment to be used for each operation and of the sequence of operations.

## 1.4 REGULATORY AND SAFETY REQUIREMENTS

Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the "Contract Clauses," safety requirements shall conform with ANSI A10.6, "Demolition Operations - Safety Requirements."

## 1.5 Existing Work

Protect existing work which is to remain in place, be reused, or remain the property of the Government. Repair items which are to remain and which are damaged during performance of the work to their original condition, or replace with new. Do not overload pavements to remain.

## PART 2 PRODUCTS

Not used.

## PART 3 EXECUTION

## 3.1 PAVING AND SLABS

Remove concrete and asphaltic concrete paving and slabs as indicated.  
Provide neat sawcuts at limits of pavement removal as indicated.

## 3.2 DISPOSITION OF MATERIAL

Except where specified in other sections, all materials and equipment removed, and not reused, shall become the property of the Contractor and shall be removed from Government property. Title to materials resulting from demolition, and materials and equipment to be removed, is vested in the Contractor upon approval by the Contracting Officer of the Contractor's demolition and removal procedures, and authorization by the Contracting Officer to begin demolition. The Government will not be responsible for the condition or loss of, or damage to, such property after notice to proceed. Materials and equipment shall not be viewed by prospective purchasers or sold on the site.

## 3.3 CLEANUP

Remove and transport debris and rubbish in a manner that will prevent spillage on streets or adjacent areas. Clean up spillage from streets and adjacent areas. Conform to other applicable requirements under Section 01560, "Temporary Controls."

-- End of Section --

## SECTION 02082

REMOVAL AND DISPOSAL OF STORAGE TANKS  
03/93

## PART 1 GENERAL

## 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

## AMERICAN PETROLEUM INSTITUTE (API)

API RP 1604	1987 (Supp. 1989) Removal and Disposal of Used Underground Petroleum Storage Tanks
API PUBL 1628	1989 Assessment and Remediation of Underground Petroleum Releases
API PUBL 2015	1991 Safe Entry and Cleaning of Petroleum Storage Tanks

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 4397	1991 Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications
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## CODE OF FEDERAL REGULATIONS (CFR)

40 CFR 280	Owners and Operators of Underground Storage Tanks
29 CFR 1910	Occupational Safety and Health Standards

## CORPS OF ENGINEERS (COE)

COE EM-385-1-1	1992 Safety and Health Requirements Manual
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## ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA SW-846	1986 Evaluating Solid Waste
EPA 600-4-79-20	1976 Contaminant Monitoring

## 1.2 DESCRIPTION OF WORK

The work includes removing and disposing of aboveground and underground storage tanks, service pits, asphalt, associated piping, contaminated soil and water; shoring the excavation pit, backfilling, compaction grading, seeding and pavement replacement.

### 1.2.1 Tank Closure

Perform work to close, remove, and dispose of storage tanks, service pits and connecting piping; including but not limited to dewatering (if approved), disposal of contaminated soil, laboratory testing, providing reports which are required by regulatory agencies, and backfilling.

### 1.2.2 Regulations

Perform work in accordance with local, State, and Federal regulations and 40 CFR 280.

## 1.3 SUBMITTALS

Submit the following in accordance with Section 01300, "Submittals."

### 1.3.1 SD-08, Statements

- a. Site safety and health plan
- b. Excavation and material handling plan
- c. Field sampling and laboratory testing plan
- d. Tank and piping removal and disposal plan
- e. Qualification
- f. Spill and discharge control plan

#### 1.3.1.1 Site Safety and Health Plan

Describe safety and health plan and procedures as related to underground tank removal and pipe removal, and as related to operations associated with petroleum contaminated soils and water. Furnish the name and qualifications based on education, training, and work experience of the proposed Site Safety and Health Officer.

#### 1.3.1.2 Excavation and Material Handling Plan

Describe methods, means, equipment, sequence of operations and schedule to be employed in excavation, transport, handling, and stockpiling of soil during underground tank storage pit removal. Fifteen days before beginning tank removal work, submit to the Contracting Officer for approval a material handling plan that describes phases of dealing with the contaminated soil and water as it relates to the proposed tanks and piping removal, including methods of excavating, a material handling plan for the contaminated material, soil testing requirements, safety precautions and requirements, and water pumping and collection requirements.

#### 1.3.1.3 Field Sampling and Laboratory Testing Plan

Describe field sampling methods and quality control procedures. Identify laboratory and laboratory methods to be used for contamination testing. Sample reports shall show sample identification for location, date, time,

sample method, contamination level, name of individual sampler, identification of laboratory, and quality control procedures. Laboratory must be TDEC approved. Analytical Quality Control Requirements to be per TDEC UST Site Closure Guidelines. (Field blanks, trip blanks, background sample, duplicate, matrix spike and matrix spike duplicate.)

#### 1.3.1.4 Tank and Piping Removal and Disposal Plan

Describe methods, means, sequence of operations, and schedule to be employed in the testing, pumping, cleaning, de-vaporizing, inspecting, removal, and disposal of underground storage tanks and piping.

#### 1.3.1.5 Qualification

Prior to start of work, submit documentation of recent experience and resumes of personnel working on the project.

#### 1.3.1.6 Spill and Discharge Control Plan

Describe procedures and plan related to potential spills and discharge of contaminated soils and water.

#### 1.3.2 SD-09, Reports

- a. Identification of tanks removed and disposed of, including site map showing location of tank and piping
- b. Starting and ending dates of reporting period
- c. Closure report. Incorporate reports, records, and data into a single binder with the title "SITE ASSESSMENT REPORT" on the cover of the binder. Perform a tank closure site assessment per EPA and TDEC Chapter 1200-1-15 UST Rules and Regulations before closure is completed. EPA and TDEC QA/QC on site assessment to be maintained.
- d. Laboratory testing reports, including location of soil excavated and associated OVA/FID (organic vapor analyzer/flame ionization device) readings, TPH (total petroleum hydrocarbons), and BTEX (benzene, toluene, ethylbenzene, and xylene), and TCLP (toxicity characteristic leaching procedure) sampling and test results. If BTEX indicates gasoline, then provide TCLP
- e. Cumulative quantities of soil excavated, beginning with start date for each tank and associated piping

#### 1.3.3 SD-18, Records

- a. Building permit, inspection permits, and other permits required for underground tank removal
- b. Results of excavation including sketch showing location of underground storage tank, sampling locations, and extent of excavation
- c. Tank disposal paperwork, such as copy of UST Notification Form



and method of conditioning tank for disposal

- d. Contaminated soil disposal paperwork, such as laboratory testing reports
- e. Contaminated water disposal paperwork, such as laboratory testing results

#### 1.4 AREAS OF CONTAMINATION

Assume for bidding purposes that soil, bituminous pavement, concrete slabs, and water encountered during the removal of the underground tanks are contaminated with diesel fuel and waste oil and shall be handled as specified herein. Payment for removal from temporary stockpile and disposal of contaminated soil and providing clean soil shall be paid for at the contract unit price per cubic yard. Assume for bidding purposes that removal will require an overexcavation of petroleum contaminated soils of approximately 100 cubic yards. Bituminous pavement and concrete slabs shall be washed and disposed of as demolition debris. Wash water shall be collected and stored. Disposal of contaminated water shall be paid for at the contract unit price per gallon.

#### 1.5 QUALIFICATION (CONTRACTOR EXPERIENCE)

Prior to start of work, submit data for approval showing that the tank removal Contractor, subcontractors, and personnel employed on the project have been engaged in removal, transportation, and disposal of underground tanks and associated piping, are familiar with and shall abide with the following:

- a. API RP 1604.
- b. 40 CFR 280 and State and local regulations and procedures.
- c. Applicable safety rules and regulations.
- d. Use of equipment and procedures for testing and vapor-freeing tanks.
- e. Handling and disposal of types of wastes encountered in underground tank and pipe removal including disposal of underground tanks and associated piping.
- f. Excavation, testing, and disposal of petroleum contaminated soils, liquids, and sludge.
- g. Provide documentation that the Contractor and persons engaged in the closure of this tank system shall be certified and licensed by the Tennessee Department of Commerce and Insurance Board for Licensing Contractors, Subsection S, UST Installation, Removal, and Remediation of Pollutants. During the closure, at least one certified person must be on site at all times.

## 1.6 COMPLIANCE

Remove the storage tanks and associated piping in accordance with EPA Underground Storage Tank Regulations Title 40 CFR 280.71 and the Tennessee Department of Environment and Conservation (TDEC), Chapter 1200-1-15-.07. Note permits and notification required for removal of UST systems. Obtain permits and issue tank closure notification as required by TDEC.

## PART 2 PRODUCTS

### 2.1 PLASTIC SHEETING

ASTM D 4397.

## PART 3 EXECUTION

### 3.1 REMOVAL AND DISPOSAL OF TANKS

Furnish labor, materials, necessary permits, laboratory tests, and reports and equipment to remove and dispose of products remaining in the underground tanks; clean and vapor free the underground tanks and connecting piping; excavate, remove tanks and associated piping, and backfill to the level of the adjacent ground; sample soil and water to determine if contaminated; dispose of tanks and associated piping, petroleum contaminated soil and water. Provide work in accordance with 40 CFR 280 and in accordance with appropriate Federal, State, and local regulations.

### 3.2 SITE SAFETY AND HEALTH PLAN (SSHP)

Furnish safety, health, and accident prevention provisions and develop a Site Safety and Health Plan (SSHP). The SSHP shall incorporate the requirements of 29 CFR 1910 and COE EM-385-1-1. Site work shall not start until the SSHP is approved by the Contracting Officer.

### 3.3 SITE SAFETY AND HEALTH OFFICER

Identify an individual to serve as the Site Safety and Health Officer (SSHO). The SSSH shall report problems and concerns regarding health and safety to the Contracting Officer. The SSSH shall have a working knowledge of local and Federal occupational safety and health regulations, and shall provide training to Contractor employees in air monitoring practices and techniques. The SSSH shall also provide day to day industrial hygiene support, including air monitoring, training, and daily site safety inspections. The SSSH shall be trained in the use of the monitoring and sampling equipment, interpretation of data required to implement the SSHP, and to administer the elements of the SSHP. The SSSH shall remain on site during project operations and may be assigned other duties, such as project foreman or quality control manager.

### 3.4 SPILL AND DISCHARGE CONTROL PLAN

Develop, implement, and maintain a comprehensive spill and discharge control plan. The plan shall provide contingency measures for potential spills and discharges from handling and transportation of contaminated

soils and water. A possible source of guidance for assessment and remediation is API PUBL 1628.

### 3.5 EXCLUSION ZONE (EZ) AND CONTAMINATION REDUCTION ZONE (CRZ)

Do not permit personnel not directly involved with the project to enter work zones, called the EZ and CRZ. The EZ shall be an area around the tank a minimum of 10 feet from the limits of the tank excavation. At the perimeter of the EZ, establish a CRZ. Limits of the CRZ shall be established by the Contractor. Within the CRZ, equipment and personnel shall be cleaned as stated in the paragraph entitled "Personnel and Equipment Decontamination." The Contractor's site office, parking area, and other support facilities shall be located outside the EZ and CRZ. Boundaries of the EZ and CRZ shall be clearly marked and posted. Include a site map, outlining the extent of work zones and location of support facilities, in the SSHP.

### 3.6 TRAINING

Provide health and safety training in accordance with 29 CFR 1910 prior to starting work. Furnish copies of current training certification statements for personnel prior to initial entry into the work site.

### 3.7 PERSONNEL PROTECTION

Furnish appropriate personal safety equipment and protective clothing to personnel and ensure that safety equipment and protective clothing is kept clean and well maintained. Furnish three clean sets of personal protective equipment and clothing for use by the Contracting Officer or official visitors as required for entry into the EZ.

### 3.8 DECONTAMINATION

Decontaminate or properly dispose of personal protective equipment and clothing worn in contaminated areas at the end of the work day. The SSHO shall be responsible for ensuring that personal protective clothing and equipment are decontaminated before being reissued.

### 3.9 FIRST AID AND EMERGENCY RESPONSE EQUIPMENT AND PROCEDURES

Provide appropriate emergency first aid equipment for treatment of exposure to site physical and chemical hazards. Provide and post a list of emergency phone numbers and points of contact for fire, hospital, police, ambulance, and other necessary contacts. Provide and post a route map detailing the directions to the nearest medical facility.

### 3.10 IGNITION SOURCES

Do not permit ignition sources in the EZ and CRZ.

### 3.11 PERSONNEL AND EQUIPMENT DECONTAMINATION

Decontaminate personnel and equipment before exiting the work zones.

### 3.12 WASTE DISPOSAL

The SSHP shall detail the practices and procedures to be utilized to dispose of wastes. Upon completion of the project, certify that equipment and materials were properly decontaminated prior to being removed from the site.

### 3.13 EMERGENCY RESPONSE REQUIREMENTS

Furnish emergency response and contingency plan in accordance with 29 CFR 1910. In an emergency, take action to remove or minimize the cause of the emergency, alert the Contracting Officer, and institute necessary measures to prevent repetition of the emergency. Equip site-support vehicles with route maps providing directions to the medical treatment facility.

### 3.14 UNFORESEEN HAZARDS

Notify the Contracting Officer of any unforeseen hazard or condition which becomes evident during work.

### 3.15 ADDITIONAL REQUIREMENTS

Provide clean and vapor free tank in accordance with API PUBL 2015 and the following:

#### 3.15.1 Tank Removal and Closure

Tank No. N-112,	550 gallon steel underground waste oil tank (SWMU).
Tank No. N-12,	55 gallon steel underground diesel fuel storage tank.
Tank No. 890,	300 gallon steel underground diesel fuel storage tank.
Tank No. 378,	500 gallon steel underground diesel fuel storage tank.
Tank No. 383,	500 gallon steel underground diesel fuel storage tank.
*Tank No. 1695,	300 gallon steel aboveground diesel fuel storage tank.
*Tank No. 1696,	300 gallon steel aboveground diesel fuel storage tank.
Tank No. 340,	125 gallon steel aboveground diesel fuel storage tank.
Tank No. N-2,	500 gallon steel underground diesel fuel storage tank.
Tank No. 1637B,	2000 gallon underground waste oil storage tank.

\*These tanks may be given to the community.

Aboveground storage tanks (AST) are not regulated by the Tennessee Department of Environment and Conservation (TDEC). The Department of Commerce and Insurance, Division of Fire Prevention, has adapted the National Fire Protection Association (NFPA) 30, Flammable and Combustible Liquids Code and NFPA 30A as the recommended standards for AST construction, operation, and closure. Closure activities shall be per NFPA 30, NFPA 30A, and the following:

Following the AST removal, the surface soil shall be sampled to determine if a release has occurred. The number of samples to be per Fig 4-1 and analyticals shall be per the tank closure plan.

Contaminated soil shall be excavated, the pit shall be sampled per Fig 4-1. If clean, then backfill, compact and seed. Closure activities for these tanks shall be negotiated with TDEC and follow the guidelines in the TCP, Section 4.4.

Soil pile shall be sampled per TDEC TDG 005.

The tank closure shall meet all Federal, state, and county storage tanks closure requirements.

### 3.15.2 Fuel Removal

All possible fuel will be pumped or otherwise removed from the tank by the Government. Consider remaining fuel contaminated or waste fuel; pump into 55 gallon drums or other suitable containers for disposal in accordance with approved procedures meeting local, State, and Federal regulations. Dispose of remaining fuel emulsions in accordance with applicable local, State, and Federal regulations. Drums or tanks used for containerizing waste fuel will be furnished by the Contractor.

### 3.15.3 Tank Pits

Tank pits NP-1, NP-2, NP-3, NP-4, SP-1, SP-2, and SP-3 are to be removed. These pits are not listed as Solid Waste Management Units (SWMU) but will be treated as a SWMU, therefore, an Interim Measure Work Plan (IMWP) must be prepared before closure of this unit. SWMU guidelines are provided in the TCP, Section 3.0.

The following work to be completed last. Building N-121 Plating Shop Drw Well (SWMU 3), and Building N-126 Plating Shop Dry Well (SWMU 7) will be removed. Prepare a RCRA Facility Assessment (RFA) which includes soil and groundwater sampling results for SWMU 7 and soil data for SWMU 3. Each of these sites will require an Interim Measure Work Plan. See TCP, Appendix B. ?

### 3.16 TEMPORARY CONTAINMENT OF EXCAVATED SOIL

Provide temporary containment area near the excavated area. Cover containment area with 30 mil polyethylene sheeting and tape the seams. Place excavated soil on the impervious barrier and cover with 10 mil polyethylene sheeting. Tape the seams. Provide straw bale berm around the outer limits of the containment area and cover with polyethylene sheets. Secure edges of sheets to keep the polyethylene sheeting in place.

### 3.17 EXCAVATION

Notify the Contracting Officer at least 48 hours prior to start of tank removal work. Stage operations to minimize the time that tank excavation is open and the time that contaminated soil is exposed to the weather. Provide protection measures around the excavation area to prevent water runoff and to contain the soil within the excavation area.

#### 3.17.1 Excavation Procedures

Excavate a distance of 2 feet all around the tank and 2 feet below the tank. Excavated soil shall be field screened (visual for petroleum staining, petroleum odors, and instrument photo ionization detector (PID), segregated based on screening, and temporarily stored in the appropriate containment area. Contractor shall screen the smallest practical contained

volume (i.e. equipment bucket) as material is excavated. Collect and temporarily store water runoff from stockpiled soils. To determine soil contamination levels, continuously monitor soil materials excavated to remove tanks with an OVA/FID capable of detecting volatile organic vapors to a minimum of one ppm. Contaminated soils with OVA/FID readings of 10 ppm or greater shall be further tested for TPH and BTEX as specified herein. Soils with OVA/FID readings less than 10 ppm may be used as clean backfill. Contaminated soils shall be disposed of in accordance with Federal, State, and local regulations.

### 3.17.2 Excavation Methods

Select methods and equipment to remove soil to minimize disturbance to areas beyond the limits of the excavation area. Provide for overexcavation of tank pit to remove petroleum contaminated soils that are above TEC action level. The overexcavation as well as disposal of petroleum contaminated soil to be considered remedial action. (Note: If it is necessary to overexcavate more than 100 cubic yards (CY) of material from the tank pit, the ROICC shall be contacted for further instructions. ROICC shall coordinate with TDEC UST Division further action. Point of contact at the TDEC Memphis field office is Mr. Glenn Birdwell or Mr. Ghattas Murr, Telephone Number (901) 368-7973). Material that becomes contaminated as a result of the Contractor's operations shall be removed and disposed of at no additional cost to the Government. Where excavation extends into groundwater levels, dewatering methods shall be employed on a localized basis to facilitate excavation operations. Water generated by dewatering during excavation required for removal of tanks or piping, surface water collected in open excavation, or water used for washing equipment or existing concrete or bituminous surfaces, shall be collected and tested in accordance with EPA SW-846 and EPA 600-4-79-20 and state or locally required analyses. Water that contains contaminants above locally acceptable levels shall be disposed of in accordance with Federal, State, and local regulations. Non-contaminated water may be disposed of on-site.

### 3.17.3 Structures

During excavation activities, if asphalt pavement, concrete slabs, or other structures are encountered, remove and wash with high pressure water cleaning equipment. Remove and dispose of the pavement, concrete, and other structures as specified in Section 02050, "Demolition and Removal."

## 3.18 TESTING

### 3.18.1 Stockpiled Soils

Soils with OVA/FID readings of 10 ppm or greater shall be further sampled and tested for TPH in accordance with EPA Method 418.1 and for BTEX in accordance with EPA SW-846 Method 8020 and EPA 600-4-79-20, and for toxicity characteristic leaching procedure (TCLP) for lead, EPA Method 1311 and EPA Method 7421. To determine if the soils can be landfilled as special waste at BFI Millington (Benzene < 0.5 MG/L, TPH < 10.0 MG/L and lead < 5.0 MG/L. For stockpiled soils, provide a minimum of one test for every 20 cubic yards for TPH, and one test for every 20 cubic yards for BTEX and TCLP. If TCLP indicates that soils exceed the landfill acceptance

criteria and cannot be landfilled as special waste, soils shall be disposed of through DRMO at NSA Memphis. Testing shall be done in accordance with USEPA Method 1311 with analysis by method SW846-8015 modified for TPH or as required by TDEC for No. 2 fuel oil storage tanks. Properly label removed tank in accordance with regulations. Furnish results to the Contracting Officer within 24 hours after the results are obtained.

### 3.18.2 Testing Under Tank After Removal of Tank

If tank is 20 feet or less in length, take two samples. Each sample shall be 2 feet from each end of the tank and 2 feet below the bottom of the excavation. If the tank is greater than 20 feet, take three samples. Two samples shall be 2 feet from each end of the tank and 2 feet below the bottom of the excavation. A third sample shall be taken from the middle of the tank area and 2 feet below the bottom of the excavation. Samples shall be analyzed for ~~TPH, BTEX, and TCLP~~. Sampling and analysis shall conform to standards specified above for stockpiled soils. Soil shall be sampled and analyzed for TPH, (EPA Method 418.1) and for BTEX in accordance with EPA SW-846 (Method 8020) and EPA 600-4-79-20, and a TCLP test in accordance with EPA Method 1311 and 7421. Soils that contain 50 ppm or more TPH, 10 ppm or more BTEX, or have TCLP reading of 10 ppm of lead or virgin petroleum products are considered contaminated materials. Soils which are less than the above may be used as clean fill. Furnish results to the Contracting Officer within 24 hours after the results are obtained. Along with the results furnish a sketch showing underground tank, sampling location, and extent of excavations.

### 3.18.3 Testing Along Piping

For every 25 linear feet of product delivery piping, for every change in direction, and at every mechanical joint take one soil sample and analyze for TPH, BTEX, and TCLP. Sampling and analysis of soil materials shall conform to standards specified above in the paragraph entitled "Testing Under Tank After Removal of Tank."

### 3.19 WATER DISPOSAL

Dewatering will be permitted only with approval of Contracting Officer. Water generated during removal of tanks and piping shall be stored and tested. If contaminated, transport and dispose of water in an EPA approved disposal site in compliance with Federal, State, and local requirements. Non-contaminated water may be disposed of on-site.

### 3.20 SECURING TANK SYSTEM

- a. API PUBL 2015. Remove stored product from the tank using one of the following methods:

- (1) Drain product lines into the tanks.
- (2) Remove liquids and sludge from tanks. Sludge residues shall be tested in accordance with the Toxicity Characteristic Leaching Procedure (TCLP) 40 CFR 261.24 to determine if the residue is a hazardous waste by characteristic. Hydrocarbon products, sludge, and wastewater recovered from

the tanks shall be the property of the Contractor and shall be disposed of in an EPA approved site in compliance with Federal, State, and local requirements.

(3) Remove flammable or combustible liquids.

- b. Cap the fill pipe, gage pipe, tank vapor recovery fitting, and vapor return.
- c. Cap the product piping at the service station island, at associated buildings, or where indicated if pumps are removed; or leave pumps connected and locked.
- d. Disconnect electric power to the pumps.
- e. Leave vent piping open.

3.21 REMOVAL OF UNDERGROUND TANKS ANCHORS, SLABS, AND ASSOCIATED PIPING

3.21.1 Preparation

API PUBL 2015. Remove the fill pipe, gage pipe, vapor recovery truck connection, submersible pumps, and drop tube. Cap or remove non-product piping, except vent piping. Plug tank openings so that vapors will exit through vent piping during the vapor-freeing process.

3.21.2 Purging

Remove flammable vapors in accordance to API PUBL 2015. Tanks shall be certified as "vapor free" prior to further work.

3.21.3 Cleaning and Testing

Cleaning and tank atmosphere testing shall be in accordance with API PUBL 2015. Distribution (product delivery) piping shall be cleaned and removed. Test the tank atmosphere and the excavation area for flammable or combustible vapor concentrations, with a combustible gas indicator until the tank is removed from the excavation and from the site.

3.21.4 Tank Removal

Plug or cap accessible holes. One plug shall have a minimum 1/8-inch vent hole. Excavate around the tank to uncover it for removal. Remove the tank from the excavation and place it on a level surface.

3.22 INSPECTIONS

Arrange for and perform required inspections. Provide copies of inspections to Contracting Officer.

3.23 CLOSURE REPORT (SITE ASSESSMENT REPORT)

Provide a tank closure site assessment report (2 copies) to the ROICC and (4) copies to NSA Environmental Coordinator, and (2) Southern Division, in a single binder notebook which shall contain a collection of reports,



records, inspections, pictures, documentation, and data as follows:

- a. Complete UST Notification Form (within 20 days of closure).
- b. Description of work, including removal procedures, number of tanks removed, identification of tanks removed and disposed of, cubic yards of excavated soil, location of disposal sites, dates of excavation and chain of custody forms.
- c. Site plan, including location of tanks and piping, limits of excavation, sampling points, results of excavation and depths.
- d. Laboratory testing and analysis reports, copies of data and test results from testing laboratory.
- e. Tank disposal paperwork, contaminated soil disposal paperwork, contaminated water disposal paperwork, and disposal manifest.
- f. Certifications required by implementing agency.
- g. Building permit, inspection permits, and other permits required for underground tank removal, notifications, and inspection reports.
- h. Cumulative quantities of soil excavated and disposed of, beginning with start date for each tank and associated piping.

### 3.24 SPILLS OF CONTAMINATED SOILS

Use appropriate vehicles and operating practices to prevent spillage or leakage of contaminated materials from occurring during operations. Inspect vehicles leaving the area of contamination to ensure that no contaminated materials adhere to the wheels or undercarriage.

### 3.25 BACKFILL

Provide backfill, compaction, grading, and seeding in accordance with Section 02220, "General Excavation, Filling, and Backfilling."

-- End of Section --

## SECTION 02220

GENERAL EXCAVATION, FILLING, AND BACKFILLING  
06/92

## PART 1 GENERAL

## 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 136	1984 (Rev. A) Sieve Analysis of Fine and Coarse Aggregates
ASTM D 698	1978 (R 1990) Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5-lb (2.49-kg) Rammer and 12-in. (305-mm) Drop
ASTM D 1140	1954 (R 1990) Amount of Material in Soils Finer Than the No. 200 (75-Micrometer) Sieve
ASTM D 1556	1990 Density of Soil in Place by the Sand-Cone Method
ASTM D 2487	1990 Classification of Soils for Engineering Purposes
ASTM D 2922	1981 (R 1990) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	1988 Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 4318	1984 Liquid Limit, Plastic Limit, and Plasticity Index of Soils

## 1.2 DEFINITIONS

## 1.2.1 - Hard Materials

Weathered rock, dense consolidated deposits, or conglomerate materials which are not included in the definition of "rock" but which usually require the use of heavy excavation equipment, ripper teeth, or jack hammers for removal.

### 1.2.2 Cohesive Materials

Materials ASTM D 2487 classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesive only when the fines have a plasticity index greater than zero.

### 1.2.3 Cohesionless Materials

Materials ASTM D 2487 classified as GW, GP, SW, and SP. Materials classified as GM and SM will be identified as cohesionless only when the fines have a plasticity index of zero.

## 1.3 SUBMITTALS

Submit the following in accordance with Section 01300, "Submittals."

### 1.3.1 SD-12, Field Test Reports

#### a. Density tests

## 1.4 DELIVERY, STORAGE, AND HANDLING

Perform in a manner to prevent contamination or segregation of materials.

## PART 2 PRODUCTS

### 2.1 SOIL MATERIALS

Free of debris, roots, wood, scrap material, vegetation, refuse, soft unsound particles, and frozen, deleterious, or objectionable materials. Unless specified otherwise, the maximum particle diameter shall be one-half the lift thickness at the intended location.

#### 2.1.1 Common Fill

Approved, unclassified soil material with the characteristics required to compact to the soil density specified for the intended location.

#### 2.1.2 Backfill and Fill Material

ASTM D 2487, classification GW, GP, GM, GC, SW, SP, SM, SC with a maximum ASTM D 4318 liquid limit of 25, maximum ASTM D 4318 plasticity index of 12, and a maximum of 25 percent by weight passing ASTM D 1140, No. 200 sieve.

#### 2.1.3 Topsoil

Natural, friable soil representative of productive, well-drained soils in the area, free of subsoil, stumps, rocks larger than one inch diameter, brush, weeds, toxic substances, and other material detrimental to plant growth. Amend topsoil pH range to obtain a pH of 5.5 to 7.

## 2.2 BORROW

Obtain borrow materials required in excess of those furnished from excavations from sources outside of Government property.

## 2.3 BURIED WARNING AND IDENTIFICATION TAPE

Polyethylene plastic and metallic core or metallic-faced, acid- and alkali-resistant, polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape on rolls, 3-inch-minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (intended service) LINE BELOW" or similar wording. Color and printing shall be permanent, unaffected by moisture or soil.

### Warning Tape Color Codes

Yellow:	Electric
Yellow:	Gas, Oil; Dangerous Materials
Orange:	Telephone and Other Communications
Blue:	Water Systems
Green:	Sewer Systems
White:	Steam Systems
Gray:	Compressed Air

## PART 3 EXECUTION

### 3.1 SURFACE PREPARATION

#### 3.1.1 Clearing and Grubbing

Unless indicated otherwise, remove trees, stumps, logs, shrubs, and brush within the clearing limits. Remove stumps entirely. Grub out matted roots and roots over 2 inches in diameter to at least 18 inches below existing surface.

#### 3.1.2 Stripping

Strip existing topsoil to a depth of 4 inches without contamination by subsoil material. Stockpile topsoil separately from other excavated material and locate convenient to finish grading area.

#### 3.1.3 Unsuitable Material

Remove vegetation, debris, decayed vegetable matter, sod, mulch, and rubbish underneath paved areas or concrete slabs.

### 3.2 PROTECTION

#### 3.2.1 Site Drainage

Provide for the collection and disposal of surface and subsurface water encountered during construction.

##### 3.2.1.1 Surface Drainage

So that construction operations progress successfully, completely drain construction site during periods of construction to keep soil materials sufficiently dry. Provide temporary ditches, swales, and other drainage features and equipment as required to maintain dry soils. When unsuitable working platforms for equipment operation and unsuitable soil support for subsequent construction features develop, remove unsuitable material and provide new soil material as specified herein.

#### 3.2.2 Underground Utilities

Location of the existing utilities indicated is approximate. The Contractor shall physically verify the location and elevation of the existing utilities indicated prior to starting construction.

#### 3.2.3 Machinery and Equipment

Movement of construction machinery and equipment over pipes during construction shall be at the Contractor's risk. Repair, or remove and provide new pipe for existing or newly installed pipe that has been displaced or damaged.

### 3.3 EXCAVATION

Excavate to contours, elevation, and dimensions indicated. Reuse excavated materials that meet the specified requirements for the material type required at the intended location. Keep excavations free from water. Excavate soil disturbed or weakened by Contractor's operations, soils softened or made unsuitable for subsequent construction due to exposure to weather. Refill with backfill and fill material and compact to 95 percent of ASTM D 698 maximum density. Unless specified otherwise, refill excavations cut below indicated depth with backfill and fill material and compact to 95 percent of ASTM D 698 maximum density.

### 3.4 FILLING AND BACKFILLING

Fill and backfill to contours, elevations, and dimensions indicated. Compact each lift before placing overlaying lift.

#### 3.4.1 Common Fill Placement

Compact areas not accessible to rollers or compactors with mechanical hand tampers. Aerate material excessively moistened by rain to a satisfactory moisture content. Finish to a smooth surface by blading, rolling with a smooth roller, or both.

### 3.4.2 Trench Backfilling

Backfill as rapidly as construction, testing, and acceptance of work permits.

### 3.5 COMPACTION

Expressed as a percentage of maximum density. Determine in-place density of existing subgrade; if required density exists, no compaction of existing subgrade will be required. Density requirements specified herein are for cohesionless materials. When cohesive materials are encountered or used, density requirements may be reduced by 5 percent. --

#### 3.5.1 General Site

Compact underneath areas designated for vegetation and areas outside the 5-foot line of the structure to 85 percent of ASTM D 698.

#### 3.5.2 Adjacent Area

Compact areas within 5 feet of structures to 90 percent of ASTM D 698.

#### 3.5.3 Paved Areas

Compact top 12 inches of subgrades to 95 percent of ASTM D 698.

Compact fill and backfill materials to 95 percent of ASTM D 698.

### 3.6 DISPOSITION OF SURPLUS MATERIAL

Remove from Government property surplus or other soil material not required or suitable for filling or backfilling, and brush, refuse, stumps, roots, and timber.

### 3.7 FIELD QUALITY CONTROL

#### 3.7.1 Sampling

Take the number and size of samples required to perform the following tests.

#### 3.7.2 Testing

Perform one of each of the following tests for each material used.

Provide additional tests for each source change.

##### 3.7.2.1 Fill and Backfill Material Testing

Test fill and backfill material in accordance with ASTM C 136 for conformance to ASTM D 2487 gradation limits; ASTM D 1140 for material finer than the No. 200 sieve; ASTM D 4318 for liquid limit and for plastic limit; ASTM D 698 for moisture density relations, as applicable.

## 3.7.2.2 Density Tests

Test density in accordance with ASTM D 1556, or ASTM D 2922 and ASTM D 3017. When ASTM D 2922 and ASTM D 3017 density tests are used, verify density test results by performing an ASTM D 1556 density test at a location already ASTM D 2922 and ASTM D 3017 tested as specified herein.

-- End of Section --

**Appendix C**  
**Comprehensive Health and Safety Plan**



## **7.0 COMPREHENSIVE HEALTH AND SAFETY PLAN (CHASP)**

A Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) is being conducted at the Naval Air Station (NAS) Memphis, Tennessee. The purpose of this program is to assess the nature and extent of contamination at the site and to determine if follow-up action is required to maintain compliance with environmental regulations.

This Comprehensive Health and Safety Plan (CHASP) is applicable to field operations to be conducted during the RFI at NAS Memphis. The Navy project contract number with EnSafe/Allen & Hoshall (E/A&H) is N62467-89-D-0318. A Site-Specific Health and Safety Plan (SSHSP) will be developed and implemented to address site-specific activities and hazards.

The provisions of this plan are mandatory for E/A&H personnel and those personnel under contract to E/A&H or the Navy e.g., the United States Geological Survey (USGS) whose work responsibilities call for them to enter a work zone (See 7.3 Work Areas). Such personnel must read this plan and sign the plan acceptance form (See Attachment C) before starting site activities. In addition, such personnel will operate in accordance with the most current requirements of 29 CFR 1910.120, *Standards for Hazardous Waste Workers and Emergency Responders* (HAZWOPER). These regulations include the following provisions for employees exposed to hazardous substances, health hazards, or safety hazards: training as described in 120(e), medical surveillance as described in 120(f), and personal protective equipment (PPE) described in 120(g).

All non-E/A&H personnel present in E/A&H work areas shall either adopt and abide by this CHASP and the corresponding SSHSP or shall have their own safety plan which, at a minimum, meets the requirements of the E/A&H CHASP and SSHSP.

At least one person certified in CPR and First Aid will be present during field activities. In addition, the E/A&H employees that are onsite will be certified in CPR and First Aid.

### **7.1 Site Characterization**

Upon review of available information, the following chemicals are representative of the types of chemical hazards (contamination) known or suspected to be present on NAS Memphis: benzene, toluene, ethylbenzene, xylene, polychlorinated biphenyls (PCBs), naphtha, waste oils, and cleaning solutions. SSHSPs shall be designed to protect workers from chemical hazards known or suspected to be present at a specific location. The following information will be included in the SSHSP:

- A site map displaying the location of planned work areas within the site
- The expected site-specific contaminants of concern and the (suspected) magnitude and scope of the situation
- Decontamination procedures
- A material safety data sheet (MSDS) for each contaminant known or expected of being present

#### **7.1.1 Work Areas**

Site control for all work areas will be established and maintained according to the recommendations in the EPA's *Interim Standard Operating Safety Guides*, Revised September, 1982. Three general zones of operation, each described below, will be established to reduce the potential for contaminant migration and risk of personnel exposure:

- The exclusion zone (EZ) or "hot zone"

- contamination reduction zone (CRZ), and the
- support zone (SZ)

Field personnel shall enter the SZ and don their PPE, then they will move through the CRZ and into the EZ. After completing their work or when taking a break they will leave the EZ through the CRZ, decontaminate themselves and their equipment, and leave the area through the SZ.

The exclusion zone is the area being investigated, sampled, or otherwise of interest. It is where chemical contamination is known or suspected to exist. The EZ includes the work area except for areas set aside as either the CRZ or SZ. The EZ will be defined and demarcated in the field; in the case of drilling, the EZ is typically about 50 feet in diameter with the borehole located in the middle.

Only authorized personnel that meet the training requirements of OSHA 29 CFR 1910.120 (40 hour HAZWOPER course/8-hour annual refresher course/24-hour supervised onsite training or equivalent) are permitted within the exclusion and contamination reduction zones. Documentation of these certifications will be maintained on site, as well as in the site trailer, at all times. Prior to entering the EZ, and at all times when in the EZ, all personnel shall be outfitted in and properly use all required PPE. A checkpoint may be established at the edge of the EZ to regulate the flow of personnel and equipment in and out of the area.

When using Level A, B, or C PPE, all personnel entering the EZ must use the "buddy system". All persons entering the EZ must be able to:

- Provide his or her partner with assistance
- Observe his or her partner for signs of chemical or heat exposure
- Periodically check the integrity of his or her partner's protective clothing
- Notify the shift supervisor, his representative, or others if emergency help is needed

Additionally, at least one person shall remain outside the EZ and have available at least the same level of PPE as those who entered the EZ. The person outside the EZ will provide logistical and safety support as needed.

The contamination reduction zone serves as a buffer between the EZ and the SZ and is intended to prevent the spread of contaminants from the work areas. All decontamination procedures will be conducted in this area. The CRZ shall be adjacent to and upwind of the EZ and include all decontamination stations. When leaving the SZ and entering the CRZ, personnel must be wearing the prescribed PPE. Exiting the CRZ requires the removal of all contaminants through compliance with established decontamination procedures as contained herein and in the corresponding SSHSP.

The support zone is the outermost area and is considered a non-contaminated or clean area. The support area will be equipped with an appropriate first-aid station and equipment to perform gross decontamination of health and safety equipment (e.g., air monitoring equipment). The SZ is adjacent to and upwind of the CRZ.

The actual location and boundary of work zones will be determined and demarcated in the field. Existing site conditions such as prevailing wind direction, location of utilities, roads, security, etc., shall be considered when determining zone locations.

Changes in meteorologic conditions or site conditions may necessitate relocating the CRZ or SZ. These conditions (e.g., wind direction, surface water run-off patterns, etc.) will be monitored at all times. A wind sock or similar device will be placed in a location visible to all site workers.

#### **7.1.2 Work Area Access**

A file will be maintained onsite that includes a current OSHA initial HAZWOPER training certificate (or copy) and an up-to-date refresher certificate for all employees involved in field activities. Employees that are unsure that a copy of their certificate is onsite shall bring a copy of their certificate with them and present it to the Site Health and Safety Officer before beginning field work. Personnel that fail to meet or abide by the criteria established in the CHASP or SSHSP shall be restricted from entering work areas.

Subcontractors, DOD oversight personnel, and other site visitors must provide the Site Health and Safety Officer with documentation showing that their HAZWOPER training is current and must agree to comply with this CHASP and the corresponding SSHSP or equivalent health and safety requirements prior to site entry. Personnel that fail to meet or abide by the criteria established in the CHASP or SSHSP shall be restricted from entering work areas.

The Site Health and Safety Officer may suspend site work and may instruct personnel to evacuate the area. Examples of situations when this may happen are:

- Site conditions have changed, for whatever reason, such that the SSHSP does not adequately address the current situation,
- Safety precautions being used are inadequate for the situation, or
- Personnel including E/A&H, subcontractors, visitors, or DOD are or may be exposed to an immediate health hazard.

#### **7.1.3 Site History and Description**

A review of the existing site data will be conducted to assess the potential hazards to be encountered by E/A&H and contractor personnel and addressed in the SSHSP. The location of NAS Memphis is shown on Figure 2-1, Vicinity Map.

## **7.2 Site Activities**

Field activities to be conducted as part of this RFI (e.g., soil borings, well installations, and well development) are described in the E/A&H Comprehensive Sampling and Analysis Plan (CSAP). Specific health and safety procedures associated with specific activities, hazards, and/or sites are addressed in the appropriate SSHSP.

The Site Supervisor will manage the day-to-day field operations which includes assigning field staff to specific work tasks and coordinating any required logistical support. The Site Supervisor has the authority to suspend or postpone specific field operations if he or she believes that worker health and safety concerns have not been adequately addressed.

Certain activities present a level of hazard that must be dealt with on a case by case basis. These activities are neither covered by this CHASP nor by a SSHSP. Examples of such activities are: confined space entry; moving or sampling of unknown drums or containers; and entering excavations, trenches, or test pits that are more than three feet deep. Should the Project Manager or Site Supervisor deem it necessary to perform an activity such as those listed above, it is that person's responsibility to contact the Project Health and Safety Officer and request an addendum to the SSHSP specifying the health and safety procedures, training, and conditions necessary for undertaking that task. These activities are prohibited until the SSHSP addendum is reviewed, accepted, and implemented.

## **7.3 Chemical Hazards**

Information about specific site chemical hazards will be provided in each SSHSP. Such information will include National Fire Protection Association (NFPA) ratings, symptoms of acute and chronic exposure, carcinogenicity, and OSHA permissible exposure limits (PELs). A table of exposure guidelines for expected site chemicals will be provided. Information in this table will include odor thresholds, OSHA PELs, American Conference of Governmental Industrial Hygienists threshold limit values (ACGIH TLVs), National Institute for Occupational Safety and

Health recommended exposure limits (NIOSH RELs), auto-ignition temperatures, and flammability ranges. Material Safety Data Sheets for these materials will be included in Attachment A of each SIP.

#### **7.4 Operations and Physical Hazards**

Field personnel should be aware of and act in a manner to minimize the dangers associated with physical hazards typically encountered during environmental investigations. These hazards include heat-related illnesses, uneven terrain, slippery surfaces, lifting, and use of heavy equipment. Electrical lines may be present either above or below ground, and underground gas lines may be present. Prior to the initiation of drilling activities, drilling locations must be cleared by the Naval Public Works Center (PWC).

Heavy equipment and drill rig operations will be conducted in accordance with the procedures outlined in Attachment A — *Drilling Safety Guide*, provided in this plan. Personnel conducting drill rig operations shall keep clear of all moving parts. To prevent entanglement with the drill rig, loose clothing shall not be worn. The Site Supervisor and Site Health and Safety Officer shall be aware of the potential for heat stress and other weather-related illnesses, and shall implement appropriate work regimens to minimize the likelihood of field personnel becoming ill. When conducting operations or survey work on foot, personnel will walk at all times. Running greatly increases the probability of slipping, tripping, and falling. When working in areas that support habitat for poisonous snakes, personnel shall wear protective chaps made of a heavy material designed to prevent snake bites to the legs.

#### **7.5 Employee protection**

Employee protection for this project includes standard safe work practices, NAS Memphis rules of conduct, PPE, personal decontamination procedures, equipment for extreme weather conditions, work limitations, and exposure evaluation.

**7.5.1 Standard Safe Work Practices:**

- Eating, drinking, chewing gum or tobacco, smoking, or any activity that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in any area designated as contaminated, unless authorized by the Site Health and Safety Officer.
- Hands and face must be thoroughly washed upon leaving the work area.
- No contact lenses will be worn in work areas while invasive actions are conducted.
- Whenever decontamination procedures for outer garments are in effect, the entire body should be thoroughly washed as soon as possible after the protective garment is removed.
- Contact with contaminated or suspected contaminated surfaces should be avoided. Whenever possible, do not walk through puddles, leachate, or discolored surfaces, or lean, sit, or place equipment on drums, containers, or on soil suspected of being contaminated.
- Medicine and alcohol can exacerbate the effects from exposure to toxic chemicals. Prescribed drugs should not be taken by personnel on cleanup or response operations where the potential for absorption, inhalation, or ingestion of toxic substances exists unless specifically approved by a qualified physician. Consumption of alcoholic beverages is prohibited.
- Due to the possible presence of overhead power lines, adequate side and overhead clearance should be maintained to ensure that the drill rig boom does not touch or pass close to any overhead lines.



- Due to the possible presence of underground utilities (including electric, natural gas, water, sewer, telephone, etc.), the activity and local utility representatives should be contacted and requested to identify all lines at the ground surface using characteristic spray paint or labeled stakes. A 3-yard buffer zone should be maintained during all subsurface investigations.
- Due to the flammable properties of some of the potential chemical hazards, all spark or ignition sources should be bonded and/or grounded or mitigated before soil boring advancement or other site activities begin.

**7.5.2 NAS Memphis General Rules of Conduct:**

- Liquor, firearms, narcotics, tape recorders, and other contraband items are not permitted on the premises.
- Any violation of local, state, or federal laws, or conduct which is outside the generally accepted moral standards of the community is prohibited.
- Violation of the Espionage Act, willfully hindering or limiting production, or sabotage is not permitted.
- Willfully damaging or destroying property or removing government records is forbidden.
- Misappropriation or unauthorized altering of any government records is forbidden.
- Securing government tools in a personal or contractor's tool box is forbidden.
- Gambling in any form, selling tickets or articles, taking orders, soliciting subscriptions, taking up collections, etc., is forbidden.

- Doing personal work in government shop or office, using government property or material for unauthorized purposes, or using government telephones for unnecessary or unauthorized local or long distance telephone calls is forbidden.
- Compliance with posted signs and notices is required.
- Boisterousness and noisy or offensive work habits, abusive language, or any verbal, written, symbolic, or other communicative expression which tends to disrupt the work or morale of others is forbidden.
- Fighting or threatening bodily harm to another is forbidden.
- Defacing any government property is forbidden.
- Wearing shorts of any type and/or offensive logos, pictures, or phrases on clothing is forbidden. Shirts, shoes, and pants or slacks or coverall-type garments will be worn at all times on government property.
- All persons operating motor vehicles will obey all NAS Memphis traffic regulations.

### **7.5.3 Selection of Personal Protective Equipment**

It is important that PPE be appropriate to protect against the potential or known hazards at each cleanup or investigation site. Protective equipment will be selected based on the types, concentrations, and routes of personal exposure that may be encountered. In situations where the types of materials and possibilities of contact are unknown or the hazards are not clearly identifiable, a more subjective determination must be made of the PPE required, based on past experiences and sound safety practices.

**Table 7-1**  
**Level of Protection and Criteria**

Level of Protection	Criteria for Use	Equipment
Level A	<ul style="list-style-type: none"> <li>When atmospheres are "immediately dangerous to life and health" (IDLH in the NIOSH/OSHA Pocket Guide to Chemical Hazards or other guides.)</li> <li>When known atmospheres or potential situations exist that would affect the skin or eyes or be absorbed into the body through these surfaces. Consult standard references to obtain concentrations hazardous to skin, eyes, or mucous membranes.</li> <li>Potential situations include those where immersion may occur, vapors may be generated, or splashing may occur through site activities.</li> <li>Where atmospheres are oxygen deficient.</li> <li>When the type(s) and or potential concentration of toxic substances are not known.</li> </ul>	<ul style="list-style-type: none"> <li>Positive-pressure full facepiece self-contained breathing apparatus (SCBA) or positive-pressure supplied air respirator with escape SCBA.</li> <li>Fully-encapsulating chemical protective suit.</li> <li>Chemical-resistant inner and outer gloves.</li> <li>Steel toe and shank chemical resistant boots.</li> <li>Hard hat under suit.</li> <li>Two-way radios worn inside suit.</li> <li>Optional: coveralls, long cotton underwear, disposable protective suit, gloves and boots, over fully encapsulating suit.</li> </ul>
Level B	<ul style="list-style-type: none"> <li>When respiratory protection is warranted and cartridge respirators are not appropriate. Examples of these conditions are:            When work areas contain less than 19.5 percent oxygen,            When expected contaminants do not have appropriate warning properties e.g. vinyl chloride, or            When cartridges are not available to protect against all contaminants of concern.</li> </ul>	<ul style="list-style-type: none"> <li>Chemical resistant clothes, long sleeves, hooded, one or two pieces.</li> <li>Positive-pressure full facepiece supplied air breathing apparatus or airline system with a 30-minute escape bottle.</li> <li>Hard hat.</li> <li>Inner gloves and chemical resistant gloves.</li> <li>Steel toe and shank boots.</li> <li>Optional: coveralls and disposable outer boots.</li> </ul>
Level C	<ul style="list-style-type: none"> <li>When respiratory protection is warranted and cartridge respirators are appropriate.</li> <li>When work areas contain at least 19.5 percent oxygen.</li> </ul>	<ul style="list-style-type: none"> <li>Chemical resistant clothes, long sleeves, hood optional, one or two pieces.</li> <li>Full-facepiece, air purifying respirator equipped with cartridges suitable for the hazard.</li> <li>Hard hat.</li> <li>Inner gloves and chemical resistant gloves.</li> <li>Steel toe and shank boots.</li> <li>Coveralls and disposable outer boots.</li> </ul>

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Table 7-1 Level of Protection and Criteria		
Level of Protection	Criteria for Use	Equipment
Level D	<ul style="list-style-type: none"> <li>• When level B or C is not indicated.</li> <li>• When airborne particulates do not warrant respiratory protection.</li> <li>• When work areas contain at least 19.5 percent oxygen.</li> </ul>	<ul style="list-style-type: none"> <li>• Inner gloves and chemical-resistant gloves needed to handle soil or water samples.</li> <li>• Steel toe and shank boots.</li> <li>• Hard hat (ANSI Z89.1-1969 standard).</li> <li>• Eye protection (ANSI Z87.1-1968) standard.</li> <li>• Optional: coveralls and disposable outer boots.</li> </ul>

**Notes:**

Level A protection will be selected when the highest available level of respiratory, skin, and eye protection is needed.

**Contraindications for use of Level A:**

- Environmental measures contiguous to the site indicate that air contaminants do not represent a serious dermal hazard.
- Reliable, accurate historical data do not indicate the presence of severe dermal hazards.
- Open, unconfined areas.
- Minimal probability of vapors or liquids (splash hazards) present which could affect or be absorbed through the skin.
- Total vapor readings indicate 500 ppm to 1,000 ppm.

Level B protection will be selected when the highest level of respiratory protection is needed, but cutaneous exposure to the small unprotected areas of the body, (neck and back of head) is unlikely, or where concentrations are not known to be within acceptable standards. Additionally, the permissible limit for exposure to mixtures of all site gases will be checked using the requirements of 1910.1000(d)(2)(i) to ensure that PEL is not exceeded. If the value calculated using this method exceeds 1.0, Level B PPE is required.

Level C protection will be selected when the types and concentrations of inseparable material are known, or reasonably assumed to be no greater than the protection factors associated with air-purifying respirators, and exposure to the unprotected areas of the body is unlikely to cause harm. Dust concentrations require Level C PPE, where the respirable fractions exceed the PEL of 5 mg/m<sup>3</sup> or the total concentrations exceed the PEL of 15 mg/m<sup>3</sup>.

Level D protection will be chosen when measurements of atmospheric concentrations are less than 2 ppm above background levels and work functions preclude splashes, immersion, or the potential for unexpected inhalation or contact with hazardous levels of any chemicals.

The Project Health and Safety Officer will determine the appropriate level of PPE prior to the initial entry based on the best available information. PPE requirements are subject to change as site information is updated or changes. The decision to upgrade or downgrade levels of PPE shall be made by the Project Health and Safety Officer.

Field activities which disturb soils will be initiated in Modified Level D protection except when stated otherwise in the SSHSP or site conditions (e.g., sampling results from previous studies) indicate that modified Level D is inappropriate. Modified Level D protection consists of a hard hat, appropriate chemical-resistant gloves (vinyl or nitrile), eye protection, and chemical-resistant, steel-toed and shank boots. Work coveralls (full length sleeves and pants) will be worn if free product or contaminants identified as skin irritants are encountered. This level of protection was selected because the levels of contamination detected in previous studies were low and free product was not detected.

PPE upgrades to Level C will be initiated if airborne concentrations exceeds 2 ppm above the background concentration in the breathing zone or if concentrations of any contaminant exceeds 50 percent of the OSHA PEL. See Table 7-1 for the specific criteria for use and the equipment required for each level of protection.

#### **7.5.4 Air Monitoring**

Previous site work indicates that workers may potentially be exposed to low concentrations of numerous chemicals including volatile organic compounds (VOCs), halogenated compounds, and combustible gases/vapors. Based on site history and existing sampling data, "worst case" contaminated areas will be identified prior to initiation of field activities.

Air monitoring using a photoionization detector (PID) and/or other appropriate sampling equipment will be conducted prior to beginning field activities at a new EZ and during ground disturbing activities. The PID will be field calibrated to measure VOCs relative to a 100 ppm

isobutylene standard. If VOCs are detected downhole, colorimetric detector tubes and/or other sampling media may be used to determine the identification and approximate concentration of these compounds.

A combustible gas indicator (CGI) will be used during all soil borings and well installations. The CGI will be field calibrated to measure flammable gases relative to a 23 percent lower explosive limit (LEL) methane standard. Downhole CGI readings will be collected continuously during all soil disturbing operations. Field activities will immediately cease if downhole readings exceed 10 percent LEL. If CGI readings do not subside, a careful investigation and mapping of the area will be made. Operations may not proceed until readings are below 10 percent LEL. The area will be immediately evacuated and the situation re-evaluated to determine how to proceed.

If breathing zone levels exceed 2 ppm or site conditions indicate that additional health and safety precautions are needed, field activities in the area shall stop. Field staff shall notify the Site Supervisor of the situation and he/she shall contact both the Project Manager and the Project Health and Safety Officer. The Project Health and Safety Officer will be responsible for reassessing the hazards and prescribing revised health and safety requirements as necessary, including upgraded PPE requirements, revised work schedules, and revised decontamination procedures. (Typically, PPE will be upgraded to Level C assuming that cartridge respirators are appropriate, otherwise Level B.) See Table 7-1 for specific criteria for each protection level. Work shall not proceed until breathing zone levels return to background levels, and it is reasonably anticipated that breathing zone samples will stay approximately at background levels; or the chemical constituent(s) are identified and appropriate PPE is donned.

Field monitoring values will be recorded in a field logbook and copies must be posted for field personnel review.

On a daily basis, PIDs, CGIs, and other monitoring equipment shall be calibrated or their proper function verified before being used. Throughout the day this equipment shall be periodically checked to ensure that it is working properly. A final calibration shall be conducted at the end of the work day at which time each instrument will be checked to ensure that it is free from surface contamination. Field staff shall record in their field notebooks the fact that they conducted these calibrations and checks and note whether the equipment was or was not functioning properly. When equipment is not functioning properly, it should be brought to the attention of the Site Supervisor or Site Health and Safety Officer who will arrange for repairs and/or replacement of that equipment as needed.

#### **7.5.5 Procedures and Equipment for Extreme Weather Conditions**

The seasonal climate in Memphis can be expected to be hot with high relative humidity in the summer months and moderately cold to extremely cold in the winter months. Therefore, heat-and-cold stress will be of concern for all personnel. Adverse weather conditions are important considerations in planning and conducting site operations. Extremes in hot and cold weather can cause physical discomfort, loss of efficiency, and personal injury.

##### **7.5.5.1 Exposure to Hot Weather**

Heat stress can result when the protective clothing decreases natural body ventilation even when temperatures are moderate. Various levels of personal protection may require wearing low permeability disposable suits, gloves, and boots which will prevent most natural body ventilation. Discomfort due to increased sweating and body temperature (heat stress) will be expected at the work site.

Heat stress is the metabolic and environmental heat to which an individual is exposed. The manifestations of heat strain are the adjustments made by an individual in response to the stress. The three most important categories of heat-induced illness are: heat exhaustion, heat cramps, and heat stroke. These disorders can occur when the normal responses to increased sweat

production are not adequate to meet the needs for body heat loss or when the temperature regulating mechanisms fail to function properly.

**Heat exhaustion** is a state of collapse brought about by an insufficient blood supply to the cerebral cortex portion of the brain. The crucial event is low blood pressure caused by inadequate heart output and widespread dilation of blood vessels.

**Heat Exhaustion Factors** — Factors which can lead to heat exhaustion are as follows:

- Increased dilation of blood vessels causing a decreased capacity of circulation to meet the demands for heat loss to the environment from exercise and from digestive activities.
- Decreased blood volume due to dehydration.
- Reduced blood volume due to lack of physical training, infection, intoxication (from industrial contaminants as well as from drinking alcohol), or heart failure.

**Heat Exhaustion Symptoms** — The symptoms include extreme weakness or fatigue, dizziness, nausea, or headache. More severe cases may also involve vomiting and possible unconsciousness. The skin becomes clammy and moist, the complexion pale, and the oral temperature stays normal or low, yet the rectal temperature is usually elevated (99.5°F - 101.3°F). Workers who are unacclimated run the highest risk.

**Heat Exhaustion Treatment** — In most cases, treatment of heat exhaustion is fairly simple. The victim will be moved to a cool place. If the victim is unconscious, medical assistance must be sought. Mild cases may experience immediate recovery; however, more severe cases may require several days care. No permanent effects have ever been reported.



**Heat cramps** result when the working muscles go into painful spasms. This may occur in people who perspire profusely in heat and who drink large quantities of water, but who fail to replace their bodies' salt. It is the low salt content in the blood that causes the cramping. The abdominal muscles as well as the muscles in the arms and legs may be affected. The cramps may appear during or even after work hours. Persons on a low sodium diet should not be given salt. A physician must be consulted for care of people with this condition.

**Heat stroke** is the most serious of the health problems that can arise while working in hot environments. It is caused by the breakdown of the thermo-regulatory system under conditions of stress. When this happens, perspiration stops, and the body can no longer regulate its own temperature.

**Heat Stroke Symptoms** — A heat stroke victim may be identified by hot, dry, and unusually red or spotted skin. The body core temperature can exceed 105°F. Mental confusion, irritability, and chills are common. These are all early warning signs of heat stroke; if the sufferer is not removed from the hot environment at once, more severe symptoms can follow, including unconsciousness, delirium, and convulsions, possibly ending in death.

**Heat Stroke Treatment** — Heat stroke must be treated as a major medical emergency; medical assistance must be summoned immediately.

Additional treatment:

- First aid must be administered.
- Individual must be moved to a cool location.
- Individual must be cooled through wetting, fanning, or immersion.

Care should be taken to avoid over-cooling and to begin treatment for shock by raising the legs. Early recognition and treatment of heat stroke are the only means of preventing permanent brain damage or death.

To reduce the potential for heat strokes:

- Drink plenty of fluids (to replace loss through sweating).
- Wear cotton undergarments to act as a wick to absorb moisture.
- Make adequate shelter available for taking rest breaks to cool off.

**Additional Measures for Extremely Warm Weather:**

- Wear cooling devices to aid in ventilation. (NOTE: the additional weight may affect efficiency.)
- Install portable showers or hose down facilities to cool clothing and body.
- Shift working hours to early morning and early evening. Avoid the hottest time of the day.
- Frequently rotate crews wearing protective clothing (if required).

**7.5.5.2 Exposure to Cold Weather**

Persons working outdoors in temperatures at or below freezing may experience frostbite or hypothermia. Extreme cold for a short time may cause severe injury to the surface of the body. Areas of the body that have a high surface-area-to volume ratio, such as fingers, toes, and ears, are the most susceptible.

Two factors influence the development of cold injury: ambient temperature and wind velocity. As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air, thus, on a cold day the body can cool quickly when PPE is removed and if a person has wet clothing underneath.

**Frostbite** is a condition in which the cold temperature forms ice crystals in the cells and tissues, dehydrating protoplasm and killing tissues. At the same time, circulation of the blood is blocked. Frostbite could lead to gangrene and amputation.

Frostbite damage occurs in several degrees:

- Frost nip, or incipient frostbite is characterized by sudden whitening of the skin.
- When superficial frostbite occurs, the skin has a waxy or whitish look and is firm to the touch; however, the tissue underneath has retained its resiliency.
- In deep frostbite, the tissues are cold, pale, and solid. The injury is severe. In addition to frostbite, other physiological reactions to cold may be experienced as well. Trench foot, for example, may result from prolonged exposure to low temperatures near, though possibly above, freezing. Walking on the foot is very painful. In very severe cases, the flesh dies and the foot may have to be amputated. Immersion foot is very similar although it is less severe. Although amputation is unusual, some mobility of the limb is lost. Blisters may occur around the lips, nostrils, and eyelids.

**Chilblain (pernio)**, which is an inflammation of the hands and feet caused by exposure to cold and moisture, is characterized by a recurrent localized itching, swelling, and painful inflammation on the fingers, toes, or ears, produced by mild frostbite. Such a sequence produces severe spasms and is accompanied by pain.

**Hypothermia** occurs when the body loses heat faster than it can produce it. The initial reaction involves the constriction of blood vessels in the hands and feet in an attempt to conserve the heat. After the initial reaction, involuntary shivering begins in an attempt to produce more heat.

Temperature is only a relative factor in cases of hyperthermia. Cases of exposure have occurred in temperatures well above freezing. Humidity is another important factor. Moisture on the skin and clothing will allow body heat to escape many times faster than when the skin and clothing are dry.

Hypothermia occurs when the body's core temperature drops below 96°F. When this happens, the affected person becomes exhausted. He may begin to behave irrationally, move more slowly, stumble, and fall. The speech becomes weak and slurred. If these preliminary symptoms are allowed to pass untreated, stupor, collapse, and unconsciousness occur, possibly ending in death.

To reduce effects of cold exposure:

- **Stay dry.** When the temperature drops below 40°F, change perspiration soaked clothes frequently. When clothes get wet, they lose about 90 percent of their insulating value.
- **Beware of the wind.** A slight breeze carries heat away from bare skin much faster than still air. Wind drives cold air under and through clothing. Wind refrigerates wet clothes. Wind multiplies the problems of staying dry.
- **Understand cold.** Most hypothermia cases develop in temperatures between 30°F and 50°F. Cold water running down the neck and legs or cold water held against the body by wet clothes causes hypothermia.
- **Have shelter available.** Make adequate dry, warm shelter available.
- **Provide warm drinks.**

- **Never ignore shivering.** Persistent shivering is a clear warning that a person is on the verge of hypothermia. Allow for the fact that exposure greatly reduces normal endurance. Warmth generated by physical activity may be the only factor preventing hypothermia.

#### **7.5.6 Personal Decontamination**

A CRZ will be established immediate to each sampling/boring site and will include a station for decontaminating equipment and personnel. The CRZ will be covered with sheets of 6-mil polyethylene (typically an area 20-feet by 20-feet is sufficient) with specific stations that will accommodate the removal and disposal of the protective clothing, boot covers, gloves, and respiratory protection if required.

As a general rule, equipment will be decontaminated using a soap and clean water wash solution. Equipment decontamination will be completed by personnel in Level D PPE. In the event of inclement weather (e.g., lightning) or an emergency requiring immediate evacuation, all contaminated equipment will be wrapped and taped in 6-mil polyethylene sheeting and tagged as "contaminated" for later decontamination.

Personnel working in the CRZ will be in one Level of PPE lower than personnel in the EZ. For example, if personnel in the EZ are in Level B, decon workers will be in Level C.

##### **7.5.6.1 Personal Decontamination Procedures**

The decontamination procedures, based on Level D protection, will consist of the following:

- Brushing heavily soiled boots and rinsing outer gloves and boots with soap and water.
- Removing outer gloves and depositing them in a plastic-lined container.
- Removing outer chemical protective clothing.

- Washing and rinsing inner gloves.
- Hard hats and eye protection should be washed thoroughly at the end of each work day with a soap and water solution.
- Disposable gloves and any disposable clothing will be disposed of in sealable bags and placed in a clearly labeled 55-gallon drum for disposal by the Navy.
- All field personnel are to be instructed to shower as soon as possible after leaving the site.

Decontamination procedures will be conducted at the lunch break and at the end of each work day. If higher levels of PPE are needed, adjustments will be made to these procedures and an amendment will be made to this CHASP.

All wastes (soil and water) generated during personal decontamination will be collected in clearly labelled 55-gallon drums. The drums will be labeled and characterized by E/A&H or USGS personnel for final disposal by the Navy.

#### **7.5.6.2 Closure of the Personal Decontamination Station**

All disposable clothing and plastic sheeting used during site activities will be double-bagged and disposed of in a refuse container. Decontamination and rinse solutions will be placed in a clearly labeled 55-gallon drum for later analysis and disposal. All washtubs, pails, buckets, etc., will be washed, rinsed, and dried at the end of each workday.

#### **7.5.7 Work Limitations**

All site activities will be conducted during daylight hours only. All personnel scheduled for these activities will have completed initial health and safety training and actual field training as

specified in 29 CFR 1910.120(e). All supervisors must complete an additional 8 hours of training in site management. All personnel must complete an 8-hour refresher training course on an annual basis in order to continue working at the site.

#### **7.5.8 Exposure Evaluation**

All personnel scheduled for site activities will have had a baseline physical examination which includes a stressing exam of the neurologic, cardiopulmonary, musculoskeletal and dermatological systems, pulmonary function testing, multi-chemistry panel and urinalysis, and will have been declared fit for duty. An exposure history form will be completed for each worker participating in site activities. An examination and updated occupational history will be repeated on an annual basis and upon termination of employment, as required by 29 CFR 1910.120(f). The content of the annual or termination examination will be the same as the baseline physical. A qualified physician will review the results of the annual examination and exposure data and request further tests or issue medical clearances as appropriate.

After any job-related injury or illness, there will be a medical examination to determine fitness for duty or any job restrictions. The Site Health and Safety Manager will review the results with the examining physician before releasing the employee for work. A similar examination will be performed if an employee has missed at least three days of work due to a non-job related injury or illness requiring medical attention. Medical records shall be maintained by the employer or the physician for at least 30 years following the termination of employment.

#### **7.6 Medical Monitoring Program**

All E/A&H or USGS personnel who enter hazardous-waste/spill sites or have the potential for exposure to hazardous materials from these sites must participate in the E/A&H Medical Monitoring Program or an equivalent program. The program is conducted by E/A&H's company doctor with the company Health and Safety Officer. The purpose of the program is to identify any pre-existing illnesses or problems that would put an employee at unusual risk

from certain exposures or respirators, and to monitor and evaluate exposure-related events where workers are involved in handling hazardous materials. Project managers should consult with the Health and Safety Officer and/or the company doctor concerning the scope of work and known or anticipated chemical hazards associated with each project.

- E/A&H maintains the right to exclude certain individuals from particular jobs based on reports from the company doctor. The program will be reviewed on an annual basis to determine its effectiveness. The company doctor has been employed as an independent contractor to provide medical monitoring for E/A&H.

The doctor is responsible for the following aspects of the Medical Monitoring Program:

- Selection and quality assurance of medical and laboratory services involved in carrying out the monitoring program.
- Development of a uniform medical record.
- Record retention.
- Employee notification of examination results.
- Determination of content of the medical and biological monitoring programs.
- Record review and correlation between potential exposure and effect.
- Monitoring job-related illness and injury for each employee.



#### **7.6.1 Preplacement Examinations**

Each E/A&H employee will be given a preplacement examination: to identify any preexisting illness or problem that would put the employee at an unusual risk from certain exposures; to assure that each employee can safely use negative-pressure respirators; and to develop a database to assess any exposure-related events detected during periodic medical monitoring. Data accumulation will include variables such as age, sex, race, smoking history, prior employment history, and other conditions that might bear upon the occurrence of subsequent events once employment begins.

The preplacement examination includes:

- Occupational history including previous chemical and carcinogenic exposures.
- Medical history including demographic data, family history, personal habits, past medical history, and a review of current systems.
- Fertility history.
- Physical examination stressing the neurologic, cardiopulmonary, musculoskeletal, and dermatological systems.
- Physiological parameters including blood pressure and visual acuity testing.
- Pulmonary function testing including FVC, FEV<sub>1</sub>, and FEV<sub>25-75</sub>.
- Electrocardiogram.
- PA and lateral chest X-ray.

- A multi-chemistry panel including tests of kidney and liver function.
- Red blood cell cholinesterase.
- Audiogram.

The history, physiological parameters, X-ray, screening tests, and laboratory studies will be conducted before the physical examination. After the physical examination, the medical examiner will review the results of the examination and special studies with each employee and facilitate referral for further evaluation of abnormalities detected during this examination. The Site Health and Safety Officer will provide each employee with a written summary and detailed results of the examination along with identification of any job restrictions. Additional medical testing procedures (e.g., ophthalmology/optometric assessment, specialized audiometric testing, etc.) may be required at the discretion of E/A&H's attending physician.

#### **7.6.2 Periodic and Exit Examinations**

An examination and updated occupational history will be repeated annually and include:

- Updated occupational and medical history.
- Physical examination stressing the neurologic, cardiopulmonary, musculoskeletal, and dermatological systems.
- Pulmonary function testing including FVC, FEV1, and FEV 25-75.
- Multi-chemistry panel including tests of kidney and liver function.
- Urinalysis.

The company doctor will review the results of annual examination and exposure data and request further tests or issue medical clearances as appropriate. An examination will also be administered when an employee leaves the company. The company doctor will be consulted for the contents of the exam except when the employee has had an exam within 6 months, or when there has been no site work since the last examination.

#### **7.6.3 Return-to-Work Examinations**

After any job-related injury or illness, a medical examination is required to determine fitness for duty or to identify any job restrictions. The medical examiner will review the results of this back-to-work examination with the company doctor before releasing the employee for work. A similar examination will be performed if an employee has missed at least three days of work due to a non-job-related injury requiring medical attention.

#### **7.6.4 Confidentiality**

Medical records will be maintained in a confidential manner so that only authorized persons will have access to the records. The authorized personnel will include medical staff of the joint venture or contract medical personnel, the individual, the individual's personal physician, or the individual's designated representative. Upon written request, the individual may obtain a copy of the medical file which will be provided within 15 days of the receipt of the written request. Information used for research, testing, statistical, or epidemiologic purposes will have all identifying data removed including the identity of the individual. Any medical information or findings obtained which do not affect the individual's job performance will not be made available to E/A&H in order to maintain the patient-physician confidentiality. Upon death, retirement, resignation, or other termination of services, the records will be retained by E/A&H or contracting physician.

## **7.7 Authorized Personnel**

Personnel anticipated to be onsite at various times during site activities include:

- Principal-In-Charge — Dr. James Speakman (E/A&H)
- Task Order Manager — Mr. Lawson Anderson (E/A&H)
- Project Manager — Ms. Ginny Gray (E/A&H)
- Project Health & Safety Officer — Mr. Doug Petty (E/A&H)
- Field Environmental Scientist — Mr. Robert Smith (E/A&H)
- Field Geologist — Mr. Ben Brantley (E/A&H)
- Site Supervisor — To Be Determined
- Site Health & Safety Officer — To Be Determined
- Engineer-in-Charge — Mr. Mark Taylor (SOUTHDIV)
- Naval Air Station Memphis, Tennessee Site Contact — Ms. Tonya Barker

### **7.7.1 Responsibilities of Site Supervisor**

The Site Supervisor will direct the site operations and, relative to health and safety, is responsible for assuring that:

- Field staff follow the CHASP, SSHSP, and other safety and health standard operating procedures (SOPs). Personnel that do not comply are retrained and/or instructed to leave the site and not allowed to return.
- Field staff have current HAZWOPER training.
- Field staff know who the Site Health and Safety Officer is.
- Field staff know the site-specific safety and health concerns.
- There is an adequate onsite supply of health and safety equipment.

- Field staff participate in the E/A&H Medical surveillance program (or in the case of subcontractors, an equivalent program).
- Field staff attend safety and health "kick-off" orientation and other site safety briefings.
- The Site Supervisor is also responsible for assuring that field staff who may be exposed to unique or special hazards have the training or experience necessary to safely conduct their work.

#### **7.7.2 Responsibilities of Site Health and Safety Officer**

The responsibilities of the Site Health and Safety Officer include:

- Providing the Site Supervisor with technical input on site health and safety issues.
- Observing field personnel and reporting to the Site Supervisor on the effectiveness of the CHASP and SSHSP, and observing whether field staff are utilizing proper work practices and decontamination procedures.
- Reporting significant safety violations to the Project Manager and/or Project Health and Safety Officer.
- Conducting safety briefings during field activities.
- Assuring that a copy of the Health and Safety Plan is maintained onsite during all field activities.
- Maintaining a file of HAZWOPER training certificates and appropriate refresher training certificates for onsite personnel.

The Site Health and Safety Officer will have the following qualifications: (1) 40 hours OSHA training or equivalent experience, (2) 24 hours of supervisory training or equivalent experience, (3) knowledge of the health and safety concerns for the specific work tasks being conducted, and (4) shall be trained to use the air monitoring equipment; be able to interpret the data collected with the instruments; be familiar with symptoms of chemical exposure, heat stress, and cold exposure; and know the location and proper use of onsite safety equipment. He will also be familiar with this CHASP.

The position of Site Health and Safety Officer may rotate. Often, particularly on small projects, this function is not a full time responsibility. Rather, a member of the field team is selected to serve as the Site Health and Safety Officer during a particular task. When that task is completed and/or field staff change, the Site Health and Safety Officer may change as well.

The following criteria outline when the Site Health and Safety Officer will be replaced: (1) termination of employment, (2) end of work task, (3) end of shift, (4) sickness, (5) injury, or (6) death. The SAP calls for one work shift per day. If circumstances arise that require multiple work shifts, an alternate Site Health and Safety Officer will be designated.

#### **7.7.3 Responsibilities of Onsite Field Staff**

The health and safety responsibilities of field staff include:

- Being familiar with and complying with the CHASP and SSHSP.
- Attending site health and safety briefings and being aware of anticipated chemical, physical, and biological hazards and knowing what to do when these hazards are encountered.
- Being properly trained on PPE use, safe work practices, decontamination procedures to be followed, and emergency procedures and communications.

- Properly utilizing required PPE, including respiratory protective equipment.
- Having up to date HAZWOPER training and then providing the Site Supervisor with documentation that their training is current.
- Being an up to date participant in an acceptable medical surveillance program.
- Using the buddy system when wearing respiratory protective equipment. When working in Level C or higher, a third person shall be at the work area. This person shall be suitably equipped to provide logistical and safety support to the entry team.
- Being fit-tested and physically capable of using a respirator. Should the use of respiratory protection be required, then field workers shall not have facial hair which interferes with achieving a proper fit.

In addition, field staff should always be alert and use their senses (sight, smell, etc.) to identify and react to potentially dangerous situations. When working in the EZ, visual contact should be maintained between personnel and field personnel should be close enough to assist each other during an emergency. Procedures for leaving a contaminated area must be planned and implemented before going onsite in accordance with the SSHSP.

The number of personnel and equipment in the contaminated area should be kept to a minimum in order to achieve effective site operations. All visitors to the job site must comply with the SSHSP procedures. PPE may be modified for visitors depending on the situation. Modifications must be approved by the Project Health and Safety Officer.

## **7.8 Emergency Information**

All hazardous-waste site activities present a potential risk to onsite personnel. During routine operations risk is minimized by establishing good work practices, staying alert, and by using proper PPE. Unpredictable events such as physical injury, chemical exposure, or fire may occur and must be anticipated.

If any situation or unplanned occurrence requires outside or support service, Ms. Tonya Barker, NAS Memphis Site Contact, will be informed and the appropriate contact from the following list will be made:

<b>Contact</b>	<b>Agency or Organization</b>	<b>Telephone</b>
Tonya Barker	Naval Air Station, Memphis	(901) 873-5461/5462
Mark Taylor	SOUTHDIV Engineer-in-Charge	(803) 743-0573
Law Enforcement	NAS Memphis Base Security	9-911
Fire Department	NAS Memphis	9-911
Ambulance Service	Naval Hospital, Millington Navy Road	(901) 873-5801/5802 or 9-911
Hospital	Methodist North Hospital 3960 Covington Pike	(901) 372-5211 or 9-911
Southern Poison Control Center	—	(901) 528-6048
Lawson Anderson	EnSafe/Allen & Hoshall Memphis, Tennessee	(901) 372-7962
Doug Petty	EnSafe/Allen & Hoshall	(901) 372-7962



Mark Taylor, SOUTHDIV Engineer-in-Charge will be contacted after appropriate emergency measures have been initiated onsite.

#### **7.8.1 Site Resources**

Cellular telephones will be used for emergency use and communication/coordination with NAS Memphis. First aid and eye wash equipment will be available at the work area.

#### **7.8.2 Emergency Procedures**

Conditions which may constitute an emergency include any member of the field crew being involved in an accident or experiencing any adverse effects or symptoms of exposure while onsite, or if a condition is discovered that suggests the existence of a situation more hazardous than anticipated.

The following emergency procedures should be followed:

- Site work area entrance and exit routes will be planned and emergency escape routes delineated by the Site Health and Safety Officer.
- If any member of the field team experiences any effects or symptoms of exposure while on the scene, the entire field crew will immediately halt work and act according to the instructions provided by the Site Health and Safety Officer.
- For applicable site activities, wind indicators visible to all onsite personnel will be provided by the Site Health and Safety Officer that indicate possible routes for upwind escape.

- The discovery of any conditions that would suggest the existence of a situation more hazardous than anticipated will result in the suspension of work until the Site Health and Safety Officer has evaluated the situation and provided the appropriate instructions to the field team.
- If an accident occurs, the Project Manager is to complete an Accident Report Form (See Attachment C) for submittal to the managing principal-in-charge of the project.
- If a member of the field crew suffers a personal injury, the Site Health and Safety Officer will call (901) 372-5211 or 9-911 (serious injury) to alert appropriate emergency response agencies, or administer onsite first aid (minor injury) as the situation dictates. An Accident Report Form will be completed for any such incident.
- If a member of the field crew suffers chemical exposure, the affected body areas should be flushed immediately with copious amounts of clean water, and if the situation dictates, the Site Health and Safety Officer should alert appropriate emergency response agencies or personally ensure that the exposed individual is transported to the nearest medical treatment facility for prompt treatment. (See Attachment B for directions to the emergency medical facility.) An Accident Report Form will be completed for any such incident.

Additional information on appropriate chemical exposure treatment methods will be provided through MSDS in Attachment A of each SIP. Directions to the nearest emergency medical facility capable of providing general emergency medical assistance and treating chemical burns

are provided in Attachment B of this CHASP. Directions from individual sites to the NAS Memphis South Gate will be provided as Attachment B of each SIP.

## **7.9 Forms**

The following forms will be used in implementing this CHASP:

**Plan Acceptance Form**

**Plan Feedback Form**

**Exposure History Form**

**Accident Report Form**

A SSHSP Plan Acceptance Form will be filled out by all employees working on the site before site activities begin. The Plan Feedback Form will be filled out by the Site Health and Safety Officer and any other onsite employee who wishes to fill one out. The Exposure History Form will be completed by both the Project Manager and the individual(s) for whom the form is intended. Examples of each form are provided in Attachment C of this plan.

All completed forms must be returned to the Task Order Manager at EnSafe/Allen & Hoshall, Memphis, Tennessee.

**ATTACHMENT A**

**ENSAFE CORPORATE *HEALTH AND SAFETY* MANUAL**

**DRILLING SAFETY GUIDE**

## Appendix B

# Drilling Safety Guide

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### **Drilling Safety Guide**

EnSafe is concerned about employee safety while working on or around drill rigs as well as when traveling to and from a drilling site, moving the drill rig and tools from location to location on a site, and during maintenance of the drill rig. Every drill crew will have a designated safety supervisor. The safety supervisor will have the responsibility for ensuring that all drilling operations are conducted in a safe manner. All personnel working on, with, or around a drill rig will be under the jurisdiction of the rig safety supervisor.

### **Drill Rig Safety Supervisor**

The safety supervisor for the drill crew will be the drill rig operator. However, the EnSafe safety officer still maintains the overall safety responsibility for the site. The drill crew safety supervisor is a direct representative of the site health and safety supervisor and will report any safety problems directly to the site health and safety officer. The drill rig safety supervisor will:

- Be the leader in using proper personal protective equipment. He/she will set an example for other personnel to follow.
- Enforce the requirements of the health and safety plan and take appropriate actions when other personnel are not following the requirements of the health and safety plan.
- Ensure that all drill rig and associated drill rig equipment is properly maintained.
- Ensure that all drill rig operating personnel are thoroughly familiar with the drill operations.
- Inspect the drill rig and associated drill rig equipment for damage before starting drilling operations. Check for structural damage, loose bolts or nuts, correct tension in chains and cables, loose or missing guards or protective covers, fluid leaks, damaged hoses and/or damaged pressure gauges and pressure relief valves.
- Test all emergency and warning devices such as emergency shut-down switches at least daily (prior to starting drilling operations). Drilling will not be permitted until all emergency and warning devices are functioning.
- Conduct a safety briefing daily before starting drilling operations. Any new employee will receive a copy of the drilling operations safety manual, and the drill rig manufacturer's operating and maintenance manual.
- Ensure that each employee reads and understands the drill rig manufacturer's operating and maintenance manual.
- Observe the mental, emotional, and physical capabilities of each worker.
- Ensure that each drill rig has a first aid kit and fire extinguisher.
- Maintain a list of emergency contact telephone numbers. This list will be posted in a prominent location and each drill rig employee will be informed of the list's location.

**Drill Rig Personnel Protective Equipment**

For most geotechnical, mineral, and/or groundwater drilling, drill rig personal protective equipment will include the following:

- Hard hat
- Safety shoes with steel toe and steel shank (or equivalent)
- Gloves
- Safety glasses with side shields
- Close-fitting but comfortable clothes
- Hearing protection

It is important that clothing does not have loose ends, straps, drawstrings or belts, or other unfastened parts that might become caught in or on a rotating or translating part of the drill rig.

Rings, necklaces, or other jewelry will not be worn during drilling operations.

Additional protective equipment may be required by the Site-Specific Health and Safety Plan.

**Drill Rig Housekeeping**

The following housekeeping measures must be taken for all drilling operations.

- Suitable storage locations will be provided for all tools, materials, and supplies. The storage should be conveniently located and will provide for safe handling of all supplies.
- Drill tools, supplies, and materials will not be transported on the drill rig unless the drill rig is designed and equipped to carry drill tools, supplies, and materials.
- Pipe, drill rods, casing, augers, and similar drilling tools when stored will be stacked in a manner that will prevent spreading, rolling, or sliding.
- Penetration or other driving hammers will be secured to prevent movement when not in use.
- Work areas, platforms, walkways, scaffolding, and other access ways will be kept free of materials, debris and obstructions and substances such as ice, grease, or oil that could cause a surface to become slick or otherwise hazardous.
- Never store gasoline in a nonapproved container. Red, nonsparking, vented containers marked with the word gasoline will be used. The fill spout will have a flame arrester.
- Prior to drilling, adequate site clearing and leveling will be performed to accommodate the drill rig and supplies and to provide a safe working area. Drilling will not be started when tree limbs, unstable ground or site obstructions cause unsafe tool handling conditions.

### **Maintenance Safety**

Well maintained drilling equipment makes drilling operations safer. When performing equipment/tool maintenance, the follow safety precautions will be followed:

- Safety glasses will be worn when maintenance is performed on drill rigs or drilling tools.
- Shut down the drill rig engine to make repairs or adjustments to the rig or to lubricate fittings (except to make repairs or adjustments that can only be made while the engine is running).
- Always block the wheels or lower the leveling jacks or both. Set the hand brake before working under a drill rig.
- Release all pressure on hydraulic systems, the drilling fluid system, and the air operating system of the drill rig prior to performing maintenance.
- Use extreme caution when opening drain plugs and radiator caps and other pressurized plugs and caps.
- Allow time for the engine and exhaust to cool before performing maintenance on these systems.
- Never weld or cut on or near the fuel tank.
- Do not use gasoline or other volatile or flammable liquids as a cleaning agent.
- Follow the manufacturer's recommendations for quantity and type of lubricants, hydraulic fluids and coolants.
- Replace all caps, filler plugs, protective guards or panels, and high pressure hose clamps and chains or cables that have been removed during maintenance.
- Perform a safety inspection prior to starting drilling equipment after maintenance is performed.

### **Safe Use of Hand Tools**

There are a large number of hand tools that can be used on or around a drill rig. The most important rule of hand tools is to use a tool for its intended purpose. The following are a few general and specific safety rules to follow when using hand tools.

- When using a hammer, wear safety glasses and require all others around you to wear safety glasses.
- When using a chisel, wear safety glasses and require all others around you to wear safety glasses.
- Keep all tools cleaned and stored in an orderly manner.
- Use wrenches on nuts, not pliers.
- Use screwdrivers with blades that fit the screw slot.
- When using a wrench on a tight nut, use some penetrating oil, use the largest wrench available that fits the nut, when possible pull on the wrench handle rather than pushing, and apply force to the wrench with both hands when possible and with both feet firmly placed. Do not push or pull with one or both feet on the drill rig or the side of a mud pit or some other blocking-



off device. Always assume that you may lose your footing. To avoid serious injury if you fall, remove sharp objects from the area near you.

- Keep all pipe wrenches clean and in good repair. The jaws of pipe wrenches will be wire brushed frequently to prevent accumulation of dirt and grease which cause wrenches to slip.
- Never use pipe wrenches in place of a rod holding device.
- Replace hock and heel jaws when visibly worn.
- When breaking tool joints on the ground or on a drilling platform, position hands so that fingers will not be smashed between the wrench handle and the ground or the platform if the wrench were to slip or the joint suddenly to let go.

### **Safety During Drilling Operations**

- Do not drive a drill rig from hole to hole with the mast (derrick) in the raised position.
- Before raising the mast, look up to check for overhead obstructions.
- Before raising the mast, all drill rig personnel (except the person raising the mast) and visitors will be cleared from the area immediately to the rear and sides of the mast. All drill rig personnel and visitors will be informed that the mast is being raised prior to raising the mast.
- All drill rig personnel and visitors will be instructed to stand clear of the drill rig immediately prior to and during starting of the engine.
- All gear boxes will be in the neutral position, all hoist levers will be disengaged, all hydraulic levers will be in the nonactuating positions, and the cathead rope will not be on the cathead before starting the drill rig engine.
- The drill rig must be leveled and stabilized with leveling jacks and/or solid cribbing before the mast is raised. The drill rig will be leveled if settling occurs after initial setup.
- The mast will be lowered only when the leveling jacks are down. The leveling jacks must be in the down position until the mast is completely lowered.
- Secure and/or lock the mast according to the drill rig manufacturer's recommendations before starting drilling operations.
- The drill rig must only be operated from the control position. If the operator must leave the control position, the rotary drive and the feed control must be placed in the neutral position. The drill engine will be shut down when the operator leaves the vicinity of the drill rig.
- Throwing or dropping of tools is not permitted. All tools will be carefully passed by hand between personnel or a hoist line will be used.
- When drilling within an enclosed area, ensure that fumes are exhausted out of the area. Exhaust fumes can be toxic and may not be detected by smell.
- Clean mud and grease from boots before mounting the drill platform. Use hand holds and railings. Watch for slippery ground when dismounting from the drill platform.
- Do not touch any metal parts of the drill rig with exposed flesh during freezing weather. Freezing of moist skin to metal can occur almost instantaneously.
- All unattended boreholes must be covered or otherwise protected to prevent drill rig personnel, site visitors, or animals from stepping or falling into the hole.

- Do not attempt to use one or both hands to carry tools when climbing ladders.

#### Working on Derrick Platforms

- When working on a derrick platform, use a safety belt and a lifeline. The safety belt will be at least 4 inches wide and will fit snugly but comfortably. The lifeline, will be less than 6 feet long and attached to the derrick.
- The safety belt and lifeline will be strong enough to withstand the dynamic force of a 250-pound weight falling 6 feet.
- A safety climbing device will be used when climbing to a derrick platform that is higher than 20 feet.
- The lifeline will be fastened to the derrick just above the derrick platform to a structural member that is not attached to the platform or to other lines or cables supporting the platform.
- Tools will be securely attached to the platform with safety lines. Do not attach a tool to a line attached to the wrist or other body part.
- When working on a derrick platform, do not guide drill rods or pipe into racks or other supports by taking hold of a moving hoist line or a traveling block.
- Derrick platforms over 4 feet above the ground will have toe boards and safety railings.

#### Working on the Ground

- Workers on the ground must avoid going under elevated platforms.
- Terminate drilling operations and, if possible, lower the mast during an electrical storm.
- Overhead and buried utilities must be located and marked on all boring location plans and boring assignment sheets.
- When there are overhead electrical power lines at or near a drilling site or project, consider all wire to be charged and dangerous.
- Watch for sagging power lines before entering a site. Do not lift power lines to gain entry. Call the utility to have them lift the power lines or to deenergize the power.
- Operations adjacent to overhead lines are prohibited unless one of the following conditions is satisfied:

- Power has been shut off and positive means taken to prevent the lines from being energized.
- Equipment, or any part, does not have the capability of coming within the following minimum clearance from energized overhead lines, or the equipment has been positioned and blocked to assure no part, including cables, can come within the minimum clearances listed in the adjacent table.

Power lines nominal system kv	Minimum required clearance
0-50	10 feet
51-100	12 feet
101-200	15 feet
201-300	20 feet
301-500	25 feet
501-750	35 feet
751-1000	45 feet

- While in transit with boom lowered and no load, the equipment clearance will be a minimum of 4 feet for voltages less than 50kv, 10 feet for voltages 51kv to 345kv, and 16 feet for voltages over 345kv.
- Before working near transmitter towers where an electrical charge can be induced in the equipment or materials being handled, the transmitter will be de-energized. The following precautions will be taken to dissipate induced voltages:
  - The equipment will be provided with an electrical ground to the upper rotating structure supporting the boom.
  - Ground jumper cables will be attached to materials being handled by boom equipment when electrical charge may be induced while working near energized transmitters. Crews will be provided nonconductive poles having large alligator clips or other similar protection to attach the ground cable to the load. Insulating gloves will be used.
- Continue to watch overhead power lines. Both hoist lines and overhead power lines can be moved toward each other by the wind.
- If there are any questions concerning drill rig operations on a site in the vicinity of overhead power lines, call the power company. The power company will provide expert advice as a public service.
- Look for warning signs indicating underground utilities. Underground utilities may be located a considerable distance away from the warning sign. Call the utility and jointly determine the precise location of all underground utility lines, mark and flag the locations, and determine the specific precautions to be taken to ensure safe drilling operations.

### **Wire Rope Safety**

- All wire ropes and fittings will be visually inspected at least once a week for abrasion, broken wires, wear, reduction in rope diameter, reduction in wire diameter, fatigue, corrosion, damage from heat, improper reeving, jamming, crushing, bird caging, kinking, core protrusion, and damage to lifting hardware.
- Wire ropes must be replaced when inspection indicates excessive damage. The *Wire Rope User's Manual* may be used as a guide for determining excessive damage.
- Wire ropes that have not been used for a period of a month or more will be thoroughly inspected before being returned to service.
- All manufactured and end fittings and connections must be installed according to the manufacturer's specifications.
- Swivel bearings on ball-bearing type hoisting swivels must be inspected and lubricated daily to ensure that the swivel rotates freely under load.
- Do not drill through or rotate drill through a slipping device, do not hoist more than 10 feet of the drill rod column above the top of the last (mast), do not hoist a rod column with loose tool joints, and do not make up, tighten, or loosen tool hoists while the rod column is being supported by a rod slipping device.

- Do not attempt to brake the fall of a drill rod column with your hands or by increasing tension on the rod slipping device.
- Wire ropes must be properly matched with each sheave. The sheave will pinch wire rope that is too large. Wire rope that is too small will groove the sheave. Once a sheave is grooved, it will severely pinch and damage larger sized wire rope.
- Use tool handling hoists only for vertical lifting of tools. Do not use tool handling hoists to pull on objects away from the drill rig.
- All hoisting hooks will be equipped with safety latches.
- When tools or similar loads cannot be raised with a hoist, disconnect the hoist line and connect the tools directly to the feed mechanism of the drill. Do not use hydraulic leveling jacks for added pull for the hoist line or the feed mechanism of the drill.
- Minimize shock loading of a wire rope; apply loads smoothly and steadily.
- Avoid sudden loading in cold weather.
- Never use frozen ropes.
- Protect wire rope from sharp corners or edges.
- Replace faulty guides and rollers.
- Replace worn sheaves or worn sheave bearings.
- Know the safe working load of the equipment and tackle. Never exceed safe working limits.
- Periodically inspect clutches and brakes of hoists.
- Always wear gloves when handling wire ropes.
- Do not guide wire rope onto hoist drums with your hands.
- After installation of a new wire rope, the first lift must be a light load to allow the wire rope to adjust.
- Never leave a load suspended when the hoist is unattended.
- Never use a hoist line to ride up the mast.

#### **Cathead and Rope Hoist Safety**

- Keep the cathead clean and free of rust and oil and/or grease. The cathead must be cleaned with a wire brush when it becomes rusty.
- Check the cathead for rope-wear grooves. If a rope groove forms that is deeper than 1/8-inch, the cathead must be replaced.
- Always start work with a clean, dry, sound rope. A wet or oily rope may grab the cathead and cause drill tools or other items to be rapidly hoisted to the top of the mast. If the rope grabs the cathead or otherwise becomes tangled in the drum, release the rope and sound the alarm for all personnel to clear the area rapidly.
- The rope must not be permitted to contact chemicals.
- Never wrap the rope from a cathead around a hand, wrist, arm, foot, ankle, leg, or any other body part.
- Attach the hammer to the rope using a knot that will not slip, such as a bowline.

- A minimum of 18 inches must be maintained between the operating hand and the cathead drum when driving samplers, casing, or other tools. Be aware that the rope advances toward the cathead with each hammer blow as the sampler or other drilling tool advances into the ground. Loosen grip on the rope as the hammer falls. Maintaining a tight grip on the rope increases the chances of being pulled into the cathead.
- Do not use a rope that is longer than necessary. A rope that is too long can form a ground loop or otherwise become entangled with the operator's legs.
- Do not leave a cathead unattended with the rope wrapped on the drum.
- Position all other hoist lines to prevent contact with the operating cathead rope.
- The cathead operator must be on a level surface with good, firm footing conditions.

### **Auger Safety**

- The drill rig must be level, the clutch or hydraulic rotation control disengaged, the transmission in low gear and the engine running at low RPM when starting an auger boring.
- Seat the auger head below the ground surface with an adequate amount of downward pressure prior to rotation.
- Observe the auger head while slowly engaging the clutch or rotation control and start rotation. Stay clear of the auger.
- Slowly rotate the auger and auger head while continuing to apply downward pressure. Keep one hand on the clutch or the rotation control at all times until the auger has penetrated about one foot or more below the surface.
- Follow manufacturer's recommended methods for securing the auger to the power coupling.
- Never place hands or fingers under the bottom of an auger section when hoisting the auger over the top of the auger section in the ground or other hard surfaces such as the drill rig platform.
- Never place feet under the auger section that is being hoisted.
- Stay clear of rotating augers and other rotating components of the drill rig.
- Never reach behind or around a rotating auger.
- Use a long-handle shovel to move auger cuttings away from the auger.
- Augers will be cleaned only when the drill rig is in neutral and the augers have stopped rotating.

### **Rotary and Core Drilling Safety**

- Water swivels and hoist plugs must be lubricated and checked for frozen bearings before use.
- Drill rod chuck jaws must be checked periodically and replaced as necessary.
- The weight of the drill rod string and other expected hoist loads must not exceed the hoist and sheave capacities.
- Only the operator of the drill rig will brake or set a manual chuck to ensure that rotation of the chuck will not occur prior to removing the wrench from the chuck.

- The drill rod chuck jaws will not be used to brake drill rods during lowering into the hole.
- Drill rods will not be held or lowered into the hole with pipe wrenches.
- Do not attempt to grab falling drill rods with hands or wrenches.
- In the event of a plugged bit or other circulation blockage, the high pressure in the piping and hose between the pump and the obstruction must be relieved or bled down prior to breaking the first tool joint.
- Use a rubber or other suitable rod wiper to clean rods during removal from the hole. Do not use hands to clean drilling fluids from the drill rods.
- Do not lean unsecured drill rods against the mast.

**ATTACHMENT B**

**DIRECTIONS TO EMERGENCY MEDICAL FACILITIES**

## **DIRECTIONS TO THE NEAREST MEDICAL FACILITIES**

The nearest hospital and the nearest facility capable of treating chemical burns are the same facility, which is located at Methodist North Hospital. Therefore, there is only one set of directions.

### **Nearest Hospital**

**Methodist North Hospital  
3960 Covington Pike  
Memphis, Tennessee**

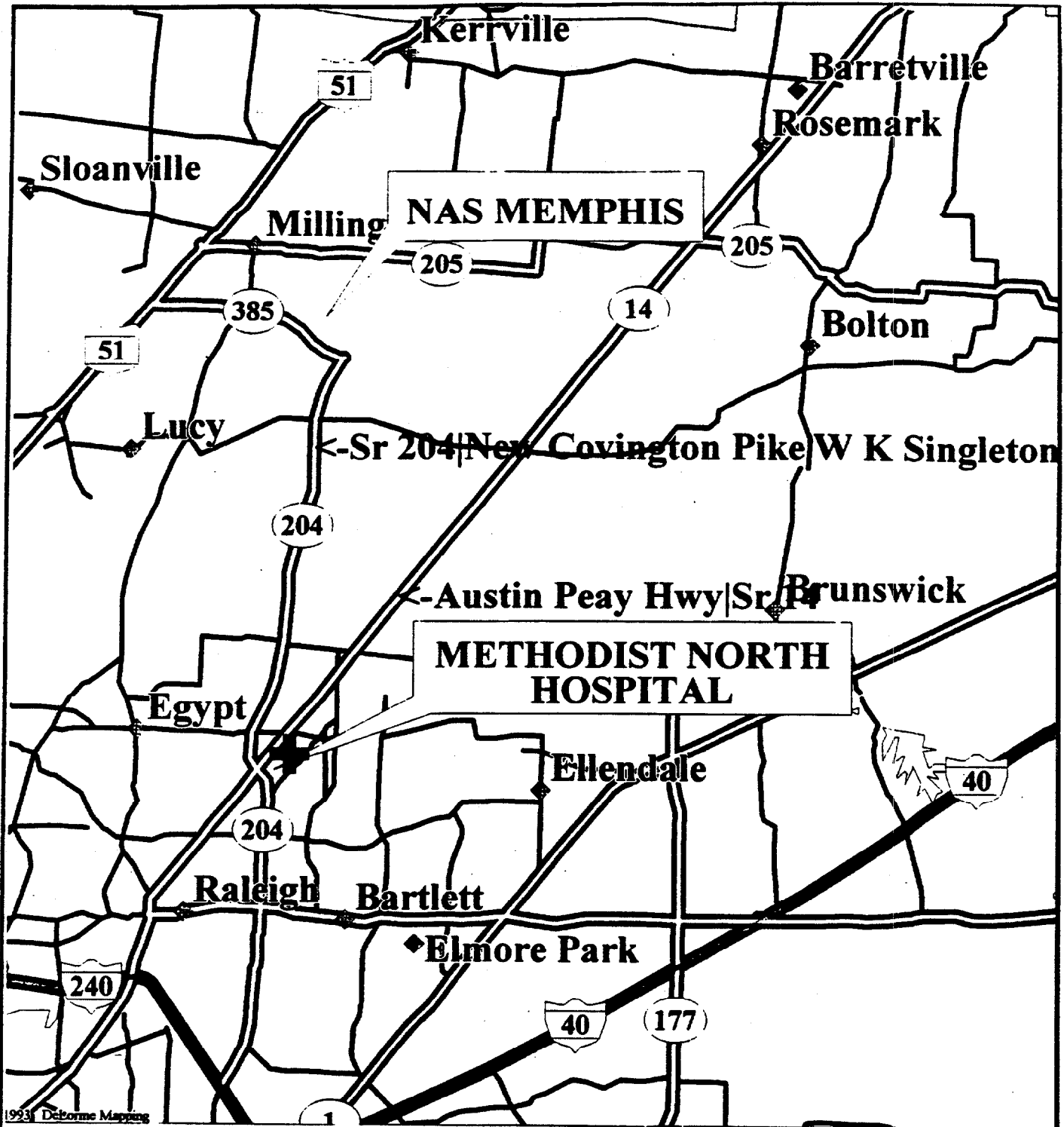
**Emergency Room Telephone Number - (901) 372-5211**

### **Directions to Methodist North Hospital from NAS Memphis Main Gate:**

1. Exit base through South Gate (Singleton Parkway).
2. Continue on Singleton Parkway through the stop signs.
4. Singleton Parkway and Covington Pike will intersect at a red light (about 5 miles).
4. You will see the entrance to the emergency room 700 feet past this light on the left.

Also, refer to the Route to Hospital Map on the following page.





HEALTH & SAFETY PLAN  
NAS MEMPHIS  
MILLINGTON, TN

DIRECTIONS TO THE HOSPITAL

DWG DATE: 10/04/94 DWG NAME: BOARD

**ATTACHMENT C**  
**HEALTH AND SAFETY PLAN FORMS**

**PLAN ACCEPTANCE FORM**

**PROJECT HEALTH AND SAFETY PLAN**

**INSTRUCTIONS:** This form is to be completed by each person working on the project work site and returned to EnSafe/Allen & Hoshall, Memphis, Tennessee.

Job No: 2151-016

Contract No: N62467-89-D-0318

Project: Comprehensive Health and Safety Plan

I represent that I have read and understand the contents of the above plan and agree to perform my work in accordance with it.

---

**Signed**

---

**Print Name**

---

**Company**

---

**Date**

# EMPLOYEE EXPOSURE HISTORY FORM

**Employee:** \_\_\_\_\_

**Job Name:** \_\_\_\_\_

**Date(s) From/To:** \_\_\_\_\_

**Hours Onsite:** \_\_\_\_\_

**Contaminants (Suspected/Reported):**

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

(See Attached Laboratory Analysis)

## PLAN FEEDBACK FORM

Problems with plan requirements:

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Unexpected situations encountered:

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Recommendations for revisions:

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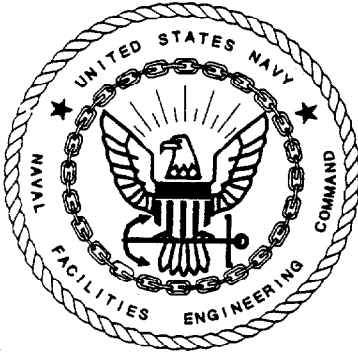
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# ACCIDENT REPORT FORM

<b>SUPERVISOR'S REPORT OF ACCIDENT</b>		<b>DO NOT USE FOR MOTOR VEHICLE OR AIRCRAFT ACCIDENTS</b>	
<b>TO</b>		<b>FROM</b>	
		<b>TELEPHONE (include area code)</b>	
<b>NAME OF INJURED OR ILL WORKER AND COMPANY</b>			
<b>WORKER'S SOCIAL SECURITY NUMBER</b>			
<b>DATE OF ACCIDENT</b>		<b>TIME OF ACCIDENT</b>	<b>EXACT LOCATION OF ACCIDENT</b>
<b>NARRATIVE DESCRIPTION OF ACCIDENT</b>			
<b>NATURE OF ILLNESS OR INJURY AND PART OF BODY INVOLVED</b>		<b>LOST TIME</b>	
		<b>YES</b> <input type="checkbox"/> <b>NO</b> <input type="checkbox"/>	
<b>PROBABLE DISABILITY (Check one)</b>			
<b>FATAL</b> <input type="checkbox"/>	<b>LOST WORK DAY WITH ____ DAYS AWAY FROM WORK</b>	<b>LOST WORK DAY WITH ____ DAYS OF RESTRICTED ACTIVITY</b>	<b>NO LOST WORK DAY</b> <input type="checkbox"/> <b>FIRST-AID ONLY</b> <input type="checkbox"/>
<b>CORRECTIVE ACTION RECOMMENDED (By whom and by when)</b>			
<b>NAME OF SUPERVISOR</b>		<b>TITLE</b>	
<b>SIGNATURE</b>		<b>DATE</b>	

**Appendix D**  
**SWMU 18 — Site-Specific Health and Safety Plan**

**VOLUNTARY CORRECTIVE ACTION WORK PLAN  
RCRA FACILITY INVESTIGATION  
NAVAL SUPPORT ACTIVITY MEMPHIS  
MILLINGTON, TENNESSEE**



**SITE-SPECIFIC HEALTH AND SAFETY PLAN  
SWMU 18 — REMOVAL OF  
UNDERGROUND WASTE TANK N-112**

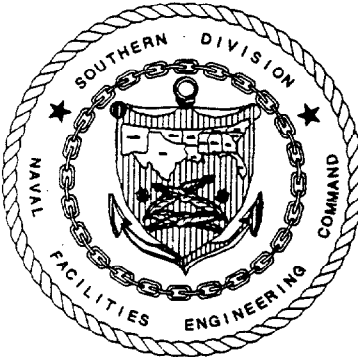
**Revision: 1**

**CTO-094**

**Contract No. N62467-89-D-0318**

**Prepared for:**

**Department of the Navy  
Southern Division  
Naval Facilities Engineering Command  
North Charleston, South Carolina**



**Prepared by:**

**EnSafe/Allen & Hoshall  
5720 Summer Trees Drive, Suite 8  
Memphis, Tennessee 38134  
(901) 383-9115**

**July 17, 1996**



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<b>Attachment B</b>	<b>Site Health and Safety Acceptance Form</b>

## 1.0 INTRODUCTION

As part of the U.S. Navy's Installation Restoration Program, EnSafe/Allen & Hoshall (E/A&H) is implementing the attached Resource Conservation and Recovery Act (RCRA) Voluntary Corrective Action Work Plan (VCAWP) for the removal of Solid Waste Management Unit (SWMU) 18, the Underground Waste Tank (UWT) N-112 associated with Building N-112 at Naval Support Activity (NSA) Memphis, Millington, Tennessee (Figure 1).

VCAWP work at this site shall be conducted in accordance with this Site-Specific Health and Safety Plan (SSHSP) and the approved NSA Memphis *Comprehensive Health and Safety Plan* (CHASP; E/A&H, 1995). Copies of both this plan and the CHASP should be onsite during all field operations.

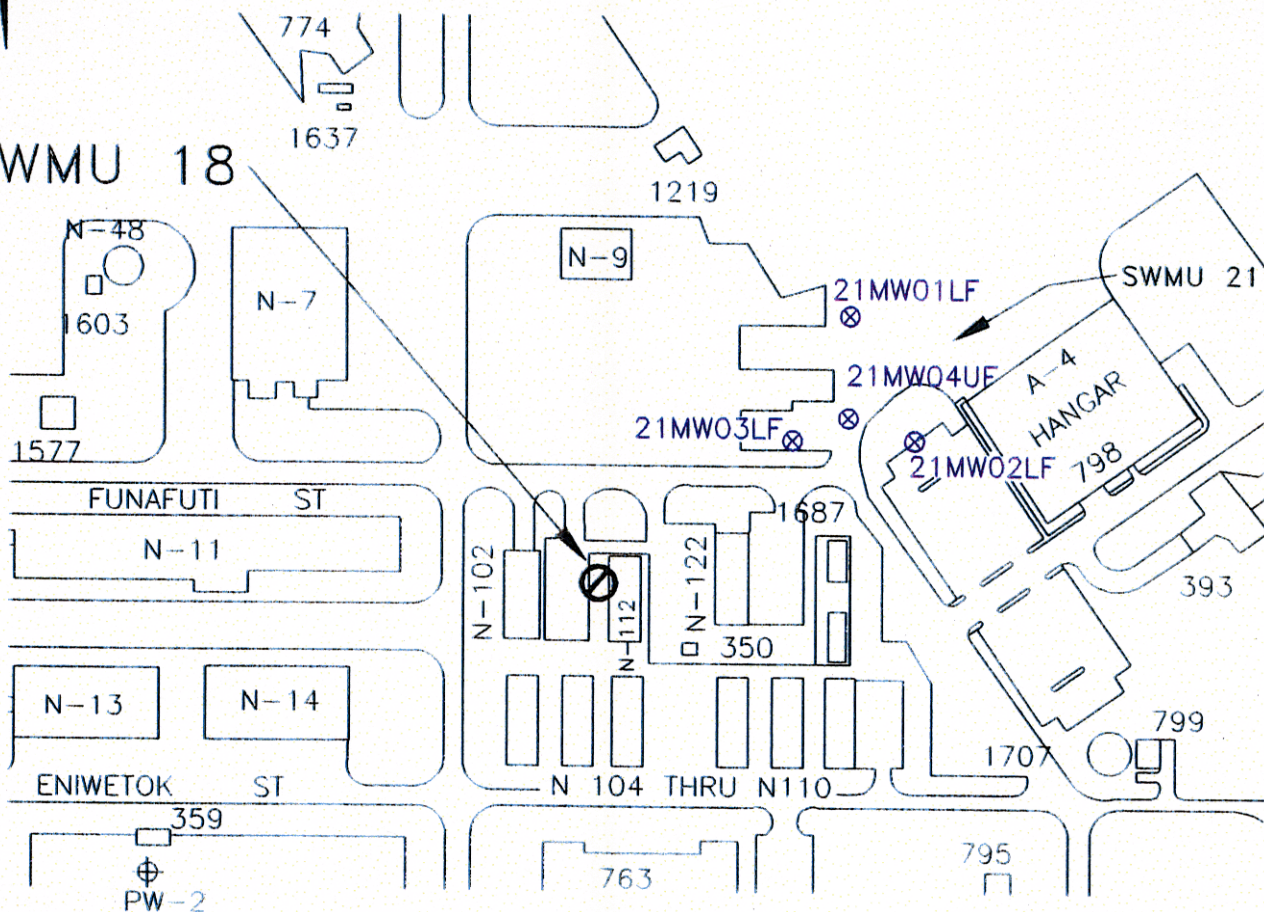
### Applicability

Current Hazardous Waste Operation and Emergency Response (HAZWOPER) training certificates for E/A&H and E/A&H subcontractors anticipated to be conducting fieldwork will be filed onsite and available for review. Individuals whose certifications are not on file, or those who have a more recent certificate (have attended a refresher course), will provide the Site Supervisor with copies of their certificates before being allowed to enter a work area.

Current Occupational Safety and Health Administration (OSHA) refresher training certificates will be available onsite for all employees involved in field activities if their refresher course requirements come up for renewal before the project begins. All subcontractors, Department of Defense (DOD) oversight personnel, and any other site visitors must provide health and safety certification with appropriate refresher course documentation prior to site entry.

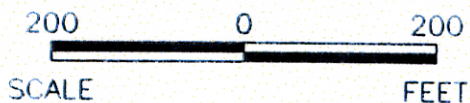


SWMU 18



LEGEND

PW-2 ⊕ PRODUCTION WELL  
⊗ MONITORING WELL



SITE-SPECIFIC  
HEALTH AND SAFETY PLAN  
NSA MEMPHIS  
MILLINGTON, TN

FIGURE 1  
VICINITY MAP  
BUILDING N-112  
UNDERGROUND WASTE TANK  
SWMU 18

DWG DATE: 06/05/96 | DWG NAME: 94VM18A

00641 C014

## **2.0 SITE CHARACTERIZATION**

### **2.1 Site Description**

SWMU 18 is UWT N-112, associated with Building N-112, which is approximately 150 feet south of Funafuti Street on the NSA Memphis Northside. The Building N-112 complex (Figure 2), is used for vehicle and ground support equipment maintenance. The underground waste tank has received various waste from the maintenance activities including waste engine oil, waste hydraulic oil, and possibly waste fuels. SWMU 44 (N-102 Hazardous Waste Accumulation Point) and SWMU 26 (N-102 Battery Acid Neutralization Unit) are also in the Building N-112 complex and have recently been investigated.

### **2.2 Work Areas**

See Section 7.1.1 of the CHASP for a description of the following work zones:

- Exclusion Zone (EZ)
- Contaminant Reduction Zone (CRZ)
- Support Zone (SZ)

For a description of field activities to be conducted at the site and within each work area see the Voluntary Corrective Action Work Plan (VCAWP).

### **2.3 Work Area Access**

Authorized personnel will be allowed access to work areas as long as they follow the requirements of this SSHSP and the CHASP. See also Work Area Access, Section 7.1.2 of the CHASP.



FUNAFUTI

STREET



SWMU 26

SWMU 18

SWMU 44

N-102

N-112

N-122

350

50 0 50  
SCALE FEET

LEGEND



SWMUs



GRASS

GRAVEL



SITE-SPECIFIC  
HEALTH AND SAFETY PLAN  
NSA MEMPHIS  
MILLINGTON, TN

FIGURE 2  
SITE MAP  
BUILDING N-112  
UNDERGROUND WASTE TANK  
SWMU 18

DWG DATE: 06/05/96 DWG NAME: 94SM18A

00641C024

## **2.4 Site Map and Work Zones**

The location and tentative layout of the site are shown in Figure 3. The actual EZ, CRZ, and SZ locations will be based on physical layout of the site, work task requirements, and current meteorological conditions.

## **3.0 SITE ACTIVITIES**

Site activities conducted by E/A&H will be limited to the collection of soil samples as described in the VCAWP. However, heavy equipment operations will be conducted throughout the investigations by the tank removal subcontractor.

## **4.0 CHEMICAL HAZARDS**

Site history shows a potential for exposure to various chemical contaminants. Based on available site knowledge, and professional judgment, Table 4-1 lists potential site chemicals and their associated exposure guidelines. Material Safety Data Sheets (MSDS) for these materials are available in the NSA Memphis Field Trailer, and available to all site personnel.

## **5.0 OPERATIONS AND PHYSICAL HAZARDS**

Physical hazards typically encountered during environmental investigations will be present at this site. These hazards include heat-related illnesses, uneven terrain, slippery surfaces, lifting, and use of heavy equipment. The Site Supervisor and Site Health and Safety Officer shall be aware of the potential for heat stress and other weather-related illnesses, and as necessary, implement appropriate work regimens to minimize the likelihood of field personnel becoming ill.

Heavy equipment operations will be conducted in accordance with the procedures outlined in the CHASP. When conducting operations or survey work on foot, personnel will walk at all times. Running greatly increases the probability of slipping, tripping, and falling.

Table 4-1  
Exposure Guidelines for Expected Site Chemical Hazards

Chemical Name	Odor <sup>a</sup> Threshold (ppm)	Physical Characteristics <sup>b</sup>	Symptoms of Exposure <sup>b</sup>	OSHA PEL <sup>c</sup> (ppm)	ACGIH TLV <sup>d</sup> (ppm)	Action Level <sup>e</sup> (ppm)	Flammable range <sup>f</sup> (% by volume)
Toluene	40	Colorless liquid with sweet, pungent, benzene-like odor.	Vapors irritate eyes and upper respiratory tract; cause dizziness, headache, anesthesia, respiratory arrest.	100 150 STEL	50	25	1.3 to 7.1
Hydraulic Fluid	Not Listed	Colorless, oily liquid with odor like burned lubricating oil.	Irritate eyes, skin, and respiratory system.	5 mg/m <sup>3</sup>	5 mg/m <sup>3</sup> 10 mg/m <sup>3</sup> STEL	2.5 mg/m <sup>3</sup>	Not Listed
PCBs	Not Listed	Light yellow oily liquid or white solid powder with a weak odor.	Acne from skin contact	0.5 mg/m <sup>3</sup>	0.5 mg/m <sup>3</sup> 1 mg/m <sup>3</sup> Skin	0.25 mg/m <sup>3</sup>	Not Listed
Cadmium	Not Listed	Soft blue-white, malleable, lustrous metal; grayish-white powder.	Pulmonary edema, dyspnea, coughing, tight chest, substernal pain; headache, chills, muscle ache; nausea, vomiting, diarrhea, anosmia, emphysema; proteinuria, mild anemia.	0.05 mg/m <sup>3</sup>	0.002 mg/m <sup>3</sup> - Respirable Fraction 0.01 mg/m <sup>3</sup> - Total Dust	0.01 mg/m <sup>3</sup>	Not Listed
Chromium	Not Listed	Blue-white to steel-gray, lustrous, brittle, hard, odorless solid.	Irritate eyes, skin; histologic fibrosis of lungs.	1 mg/m <sup>3</sup>	1 mg/m <sup>3</sup>	0.25 mg/m <sup>3</sup>	Not Listed



Table 4-1  
Exposure Guidelines for Expected Site Chemical Hazards

Chemical Name	Odor <sup>a</sup> Threshold (ppm)	Physical Characteristics <sup>b</sup>	Symptoms of Exposure <sup>b</sup>	OSHA PEL <sup>c</sup> (ppm)	ACGIH TLV <sup>d</sup> (ppm)	Action Level <sup>e</sup> (ppm)	Flammable range <sup>f</sup> (% by volume)
Lead	Not Listed	Bluish-grey, soft metal; heavy ductile, soft, grey solid.	Encephalopathy; kidney disease; irritate eyes; hypotension, weakness, facial pallor, lassitude, insomnia, PAL, eye grounds, anorexia, weight loss, malnutrition, constipation, abdominal pain, colic; anemia, gingival lead line; tremors, paralysis of wrist, ankles. Metallic taste, increased salivation, pyorrhea.	0.05 mg/m <sup>3</sup>	0.15 mg/m <sup>3</sup>	0.025 mg/m <sup>3</sup>	Not Listed
Diesel Fuel	Not Listed	Clear liquid.	Produce dizziness, headache, nausea, and possibly irritation of the eyes, nose and throat.	N.A.	N.A.	N.A.	0.7 to 7.5
Ethylbenzene	140	Colorless liquid with a sweet gasoline-like odor.	Irritation of nose, dizziness, depression. Moderate irritation of the eye with corneal injury possible. Irritates skin and may cause blisters.	100 125 STEL	100 125 STEL	50	1.0 to 6.7

Table 4-1  
Exposure Guidelines for Expected Site Chemical Hazards

Chemical Name	Odor <sup>a</sup> Threshold (ppm)	Physical Characteristics <sup>b</sup>	Symptoms of Exposure <sup>b</sup>	OSHA PEL <sup>c</sup> (ppm)	ACGIH TLV <sup>d</sup> (ppm)	Action Level <sup>e</sup> (ppm)	Flammable range <sup>f</sup> (% by volume)
Benzene	4.68	Colorless to pale yellow watery liquid with a gasoline-like odor.	Dizziness, excitation, pallor, followed by flushing, weakness, headache, breathlessness, chest constriction. Coma and possibly death.	1 5 STEL	0.1 Confirmed Human Carcinogen	0.05	1.3 to 7.1
Xylene	Not Listed	Colorless liquid with aromatic odor.	Dizziness, excitement, drowsiness, staggering gait, irritate eyes, nose throat, corneal vacuolization, anorexia, nausea, vomiting, abdominal pain, dermatitis.	100 150 STEL	100 150 STEL	50	1.0 to 7.0

**Notes:**

- a — Odor Thresholds for Chemicals with Established Occupational Health Standards, American Industrial Hygiene Association, 1989, Range of All Reference Values.
- b — Chemtox database, January 1996.
- c — 29 CFR 1910.1000, Table Z-1-A. Limits for Air Contaminants, as amended through 1/15/91. (PEL = Permissible Exposure Limit)
- d — 1990-1991 Threshold Limit Values (TLV) for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference for Governmental Industrial Hygienists (ACGIH).
- e — Action Level is the exposure limit at which personnel will implement engineering controls or upgrade levels of personal protective equipment. The Action Level is based on 50% of the PEL or TLV, whichever is lower.
- f — Flammable range is defined as the range between the Lower Explosive Limit (LEL) and Upper Explosive Limit (UEL)
- mg/m<sup>3</sup> — milligrams per cubic meter
- ppm — parts per million

## **6.0 EMPLOYEE PROTECTION**

Employee protection for this project includes standard safe work practices, NSA Memphis rules of conduct, personal protective equipment (PPE), personal decontamination procedures, and equipment for extreme weather conditions, work limitations, and exposure evaluation.

### **6.1 Standard Safe Work Practices**

See Section 7.5.1 of the CHASP for Standard Safe Work Practices.

### **6.2 NSA Memphis General Rules of Conduct**

See Section 7.5.2 of the CHASP for NSA Memphis General Rules of Conduct.

### **6.3 Selection of Personal Protective Equipment**

It is important that PPE be appropriate to protect against the potential or known hazards at each cleanup or investigation site. Protective equipment will be selected based on the types, concentrations, and routes of personal exposure that may be encountered. In situations where the types of materials and possibilities of contact are unknown or the hazards are not clearly identifiable, a more subjective determination must be made of the PPE required, based on experience and sound safety practices.

The Project Health and Safety Officer will determine the appropriate level of PPE prior to the initial site entry based on the best available information. PPE requirements are subject to change as site information is updated or changes. **The decision to upgrade or downgrade levels of PPE shall be made by the Project Health and Safety Officer.**

Field activities which disturb soils will be initiated in modified Level D protection except when stated otherwise in the SSHSP or when site conditions (e.g., sampling results from previous studies) indicate that modified Level D is inappropriate. Modified Level D protection consists

of a hard hat, appropriate chemical-resistant gloves (vinyl or nitrile), eye protection, and chemical-resistant, steel-toed and shank boots. Work coveralls (full length sleeves and pants) will be worn if free product or contaminants identified as skin irritants are encountered.

PPE upgrades to Level C will be initiated if airborne concentrations exceed 5 ppm above the background concentration in the breathing zone or if the concentration of any contaminant exceeds 50 percent of the OSHA Permissible Exposure Limit (PEL). See Table 7-1 in the Comprehensive Health and Safety Plan for the specific criteria for use and equipment for each level of protection.

#### **6.4 Air Monitoring**

Investigations at similar sites indicate that workers may potentially be exposed to low concentrations of chemicals including VOCs, halogenated compounds, and combustible gases/vapors. Air monitoring using a photoionization detector (PID) and/or other appropriate sampling equipment will be conducted prior to beginning field activities at a new EZ and during ground-disturbing activities. The PID will be field calibrated to measure VOCs relative to a 100 ppm isobutylene standard. Air monitoring will be conducted in both the work areas, and the breathing zone of the site workers.

A combustible gas indicator (CGI) will be used during all excavation activities. The CGI will be field calibrated to measure flammable gases relative to a 20 percent lower explosive limit (LEL) methane standard. CGI readings will be collected at the excavation continuously during all soil disturbing operations. Field activities will immediately cease if readings exceed 20 percent LEL. If CGI readings do not subside, a careful investigation and mapping of the area will be made. Operations may not proceed until readings are below 10 percent LEL. The area will be immediately evacuated and the situation re-evaluated to determine how to proceed.

If breathing zone levels exceed 5 ppm above background or site conditions indicate that additional health and safety precautions are needed, field activities in the area shall stop. Field staff shall notify the Site Supervisor of the situation and he/she shall contact both the Project Manager and the Project Health and Safety Officer. The Project Health and Safety Officer will be responsible for reassessing the hazards and prescribing revised health and safety requirements as necessary, including upgraded PPE requirements, revised work schedules, and revised decontamination procedures. (Typically, PPE will be upgraded to Level C assuming that cartridge respirators are appropriate, otherwise Level B.) See Table 6-1 of the CHASP for specific criteria for each protection level. Work shall not proceed until breathing zone levels return to background levels and it is reasonably anticipated that breathing zone samples will stay approximately at background levels, or the chemical constituent(s) are identified and appropriate PPE is donned.

On a daily basis, PIDs, CGIs, and other monitoring equipment shall be calibrated or their proper function verified before being used. Throughout the day this equipment shall be periodically checked to ensure that it is working properly. A final calibration shall be conducted at the end of the work day, at which time each instrument will be checked to ensure that it is free from surface contamination. Field staff shall note in their field notebooks that they conducted these calibrations and checks and note whether the equipment was or was not functioning properly. When equipment is not functioning properly it should be brought to the attention of the Site Supervisor or Site Health and Safety Officer who will arrange for repairs and/or replacement of that equipment as needed.

## **6.5 Procedures and Equipment for Extreme Hot or Cold Weather Conditions**

See CHASP Section 7.5.5.

### **Severe Weather Conditions**

All fieldwork shall immediately cease at the first sign of thunder or lightning. Field personnel shall perform emergency personal and equipment decontamination (see Section 6.6) and seek immediate shelter.

## **6.6 Personal Decontamination**

See Section 7.5.6 of the CHASP for information on personal decontamination.

### **6.6.1 Personal Decontamination Procedures**

See Section 7.5.6.1 of the CHASP for information on personal decontamination procedures. All wastes (soil and water) generated during personal decontamination will be collected in 55-gallon drums. The drums will be labeled by E/A&H personnel for later disposal.

### **6.6.2 Closure of the Personal Decontamination Station**

All disposable clothing and plastic sheeting used during site activities will be double-bagged and disposed in a labeled refuse container. Decontamination and rinse solutions will be placed in a labeled 55-gallon drum for later analysis and disposal. All washtubs, pails, buckets, etc., will be washed, rinsed, and dried at the end of each workday.

## **6.7 Work Limitations**

All site activities will be conducted during daylight hours only. All personnel scheduled for these activities will have completed initial health and safety training and actual field training as specified in 29 CFR 1910.120(e). All supervisors must complete an additional eight hours of training in site management. All personnel must complete an 8-hour refresher training course on an annual basis in order to continue working at the site.

## **6.8 Exposure Evaluation**

See Section 7.5.8 of the CHASP for information on Exposure Evaluation.

## **7.0 MEDICAL MONITORING PROGRAM**

See CHASP Section 7.6.

## **8.0 AUTHORIZED PERSONNEL**

Personnel anticipated to be onsite at various times during site activities include:

- Principal-In-Charge — Dr. James Speakman (E/A&H)
- Task Order Manager/Project Manager — Mr. Lawson Anderson (E/A&H)
- Project Health and Safety Officer — Mr. Doug Petty (E/A&H)
- Site Supervisor — Mr. Robert Smith (E/A&H)
- Engineer-in-Charge (EIC) — Mr. Mark Taylor (Southern Division [SOUTHDIV])
- Naval Support Activity Memphis, Tennessee Site Contact — Mr. Rob Williamson

### **8.1 Responsibilities of Site Supervisor**

See Section 7.7.1 of the CHASP for Responsibilities of the Site Supervisor.

### **8.2 Responsibilities of Site Health and Safety Officer**

See Section 7.7.2 of the CHASP for Responsibilities of Site Health and Safety Officer.

### **8.3 Responsibilities of Onsite Field Staff**

See Section 7.7.3 of the CHASP for Responsibilities of Onsite Field Staff.

## **9.0 EMERGENCY INFORMATION**

All hazardous waste site activities present a potential risk to onsite personnel. During routine operations risk is minimized by establishing good work practices, staying alert, and using proper PPE. Unpredictable events such as physical injury, chemical exposure, or fire may occur and must be anticipated.

If any situation or unplanned occurrence requires outside or support service, Mr. Rob Williamson, NSA Memphis Site Contact, will be informed and the appropriate contact from the following list will be made:

<b>Contact</b>	<b>Agency or Organization</b>	<b>Telephone</b>
Rob Williamson	NSA Memphis	(901) 874-5461/5462
Mark Taylor	SOUTHDIV EIC	(803) 743-0573
Law Enforcement	NSA Memphis Base Security	9-911
Fire Department	NSA Memphis	9-911
Ambulance Service	Naval Hospital, Millington Navy Road	(901) 874-5801/5802 or 9-911
Hospital	Methodist North Hospital 3960 Covington Pike	(901) 372-5211 or 9-911
Southern Poison Control Center	—	(901) 528-6048
Lawson Anderson	EnSafe/Allen & Hoshall	(901) 372-7962
Doug Petty	EnSafe/Allen & Hoshall	(901) 372-7962



Mr. Mark Taylor, SOUTHDIV EIC will be contacted after appropriate emergency measures have been initiated onsite.

### **9.1 Site Resources**

Cellular telephones may be used for emergencies and for communication/coordination with NSA Memphis. First aid and eye wash equipment will be available at the work area.

### **9.2 Emergency Procedures**

Conditions that may constitute an emergency include any member of the field crew being involved in an accident or experiencing any adverse effects or symptoms of exposure while onsite or if a condition is identified that suggests a situation more hazardous than anticipated.

The following emergency procedures should be followed:

- Site work area entrance and exit routes will be planned and emergency escape routes delineated by the Site Health and Safety Officer. Copies of the emergency contacts and routes will be posted onsite.
- If any member of the field team experiences any effects or symptoms of exposure while on the scene, the entire field crew will immediately stop work and act according to the instructions provided by the Site Health and Safety Officer.
- For applicable site activities, wind indicators visible to all onsite personnel will be provided by the Site Health and Safety Officer to indicate possible routes for upwind escape.

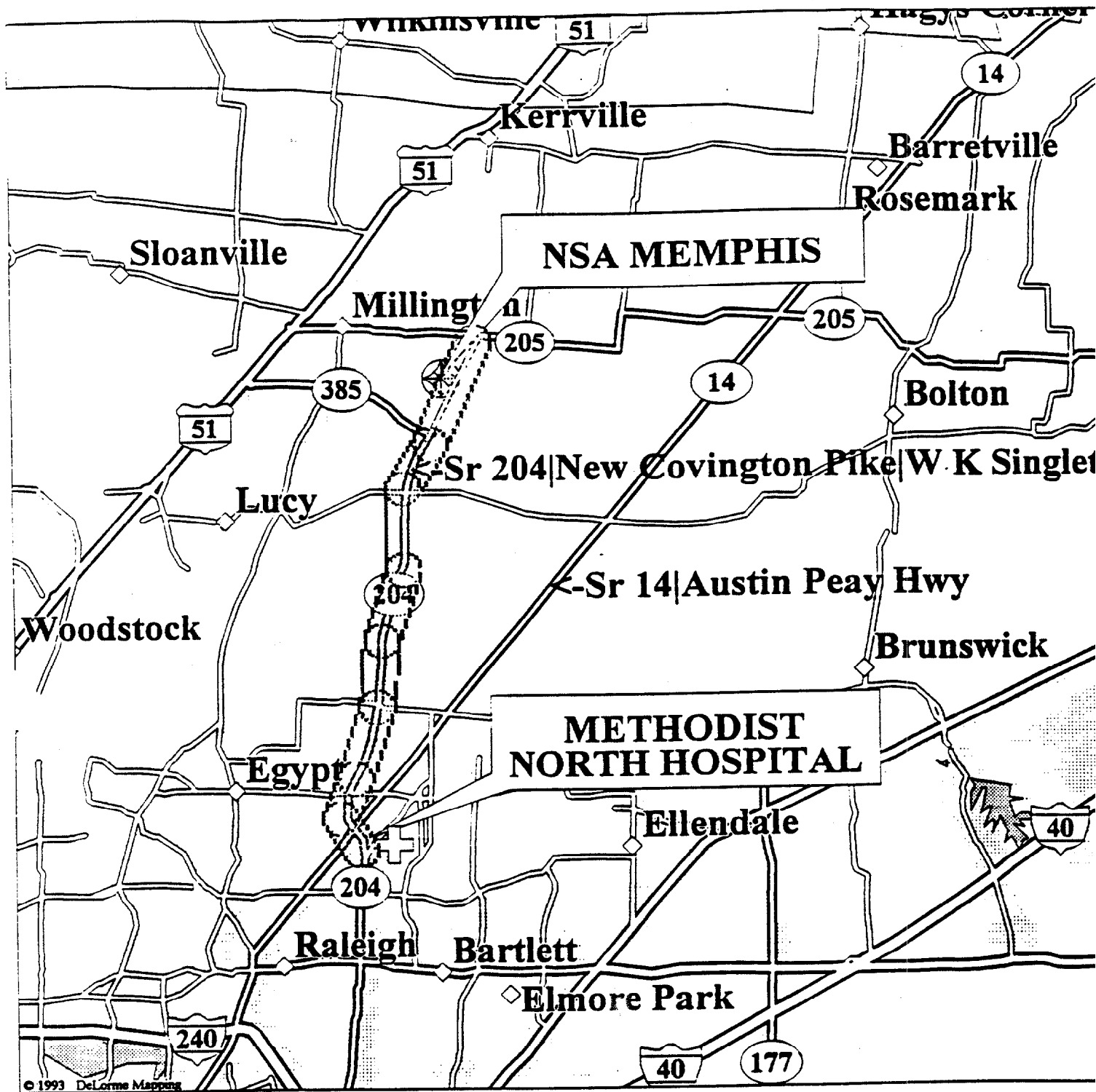
- The discovery of any conditions that would suggest the existence of a situation more hazardous than anticipated will result in the suspension of work until the Site Health and Safety Officer has evaluated the situation and provided the appropriate instructions to the field team.
- If an accident occurs, the Field Project Manager is to complete an Accident Report Form (See Attachment C of CHASP) for submittal to the managing principal-in-charge of the project.
- If a member of the field crew suffers a personal injury, the Site Health and Safety Officer will call (901) 372-5211 or 9-911 (serious injury) to alert appropriate emergency response agencies or administer onsite first aid (minor injury) as the situation dictates. An Accident Report Form will be completed for any such incident.
- If a member of the field crew suffers chemical exposure, the affected areas should be flushed immediately with copious amounts of clean water, and if the situation dictates, the Site Health and Safety Officer should alert appropriate emergency response agencies, or personally ensure that the exposed individual is transported to the nearest medical treatment facility for prompt treatment. (See Attachment A of this SSHASP for map to the emergency medical facility.) An Accident Report Form will be completed for any such incident.

Additional information on appropriate chemical exposure treatment methods will be provided through MSDS, which are in the NSA Memphis Field Trailer.

## **10.0 FORMS**

A Site Health and Safety Plan Acceptance Form is included as Attachment A. See Attachment C of the CHASP for Project Health and Safety Plan Acceptance Form, as well as all other related forms.

**Attachment A**  
**Map to Hospital**



#### LEGEND

- Population Center
- State Route
- Town, Small City
- Interstate, Turnpike
- US Highway
- County Boundary
- Major Street/Road
- State Route

- Interstate Highway
- US Highway
- Open Water

Scale 1:125,000 (at center)

2 Miles

2 KM

ROUTE TO METHODIST NORTH

Mag 11.00

Tue Feb 27 12:34:43 1996

**Attachment B**  
**Site Health and Safety Plan Acceptance Form**

## PLAN ACCEPTANCE FORM

### SITE HEALTH AND SAFETY PLAN

**INSTRUCTIONS:** This form is to be completed by each person working on the project work site and returned to the Site Manager, EnSafe/Allen & Hoshall, Memphis, Tennessee.

**Job No:** 0094-29000

**Contract No:** N62467-89-D-0318

**Project:** SWMU 18 — UWT N-112 Removal — NSA Memphis

I represent that I have read and understand the contents of the above plan and agree to perform my work in accordance with it. I certify I am in compliance with the applicable OSHA training requirements pertaining to the following:

**Check all that apply**

- ☐ 40-hour HAZWOPER training per 29 CFR 1910.120 (**required**)
- ☐ 8-hour HAZWOPER Refresher per 29 CFR 1910.120 (**required**; if applicable)
- ☐ 8-hour HAZWOPER Site Supervisor per 29 CFR 1910.120 (**required**; if applicable)
- ☐ First Aid (if applicable)
- ☐ CPR (if applicable)

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Signed

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Print Name

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Company

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Date